FLIGHT & The AIRCRAFT ENGINEER.

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM.

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NOTICE OF REMOVAL.
The Offices—Editorial and Advertisement—of "FLIGHT and The Aircraft Engineer" are now at
36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
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EDITORIAL COMMENT.

"Newspapers are an essential part of our war organisation."— *(Sir Auckland Geddes, Minister of National Service.)*

Insulting the R.F.C.

SEVERAL cases have recently come to our knowledge in which men of the R.F.C. have been subjected to insult from members of the public, who appear to regard the flying services as safe refuges for the unwilling-to-fight, at least so far as the non-commissioned ranks are concerned. We have before us now a letter from a sergeant in the R.F.C., setting forth the details of a most unpleasant episode which occurred on the Underground the other day, in which he and a friend, also in the R.F.C., were subjected to overt insult from an apparently respectable male passenger who ought to have known better. As a matter of fact, the offensive person in question was in this case certainly barking up the wrong tree, inasmuch as the soldier he insulted had served for fifteen months in France, and won the D.C.M. as an observer, while his companion had also served for an even longer period at the front in the infantry, been wounded and invalided to the R.F.C.

We had thought all this "white feather" foolishness had died a natural death with the better employment of the flappers who made the distribution of such tokens a stupid hobby at the beginning of the war. Apparently it is not so, and there is still a section, rendered safe from military service by age or by being in "protected" industries, which thinks it clever to level insult and jeers at men in uniform, particularly in the uniform of corps which by the usual nature of their duties do not share the full dangers of the infantry. It is surely almost superfluous to point out that even non-combatant services—of which the R.F.C. is certainly not one—are just as essential to the conduct of the war as the services whose sole business it is to fight. Moreover, under the present system of administration men do not select the regiments or corps in which to serve, but are detailed to those for which they are by ability and classification most suited. Therefore, there is no room for the accusation that any man is in a "safe corps" because he is afraid to take his chance in the line. As a matter of fact, the whole business is so puerile, so utterly childish, that were it only the one case to which our attention had been drawn we should have dismissed it with the thought that the "apparently respectable man of about 50" who figures in the present case had been indulging in more than his usual allowance of Government ale and was thus led to make an ass of himself. But there have been too many recent references to the "Cuthberts of the R.F.C.," and it is time that a protest was made against the prevalent idea that every man suffering from cold feet who can bring sufficient influence to bear gets himself drafted to the R.F.C. No doubt there have been such cases, but they have been a very small minority, and to give a whole corps a bad name because of the few inevitable black sheep in its ranks is going much too far. Indeed, we think the time has come when in the interests of the Service and to save trouble an official statement should be made as to the ways and methods employed in the

recruiting of the Corps. That would at once remove the impression of which these cheap insults to men who are serving their country are born.

• • •

Counsels of Pessimism.

Our very conservative contemporary, the *Engineer*, has once again adopted the rôle of prophet in the land and, in a leading article, has disposed of the future of the aeroplane to its own complete satisfaction. In a word, there *is* no future for it as a factor in commercial transport. But we refuse to be disquieted by the pessimism of our contemporary, not because we have any doubt about the outstanding technical ability with which it approaches questions of theoretical and applied mechanics, but because we have recollections of a similar want of prevision in the case of the motor car when it was as youthful as the aeroplane is to-day. In a word, while we agree that the *Engineer* knows what it is talking about when it discusses engineering problems, when it comes to commenting upon the future of a movement which is as foreign to it as horse-breeding, let us say, it most distinctly suffers from the inevitable limitation of vision imposed by specialisation within very narrow limits.

We have not the space to traverse the whole of the arguments adduced by the *Engineer* to show that after the war the aviation industry will fall into a bad way. Nor is it necessary since most of them are merely *ex parte* assertions rather than statements of ascertained fact or reasoned argument. At the same time it is but simple justice to say that our contemporary does set forth a clear statement of several aspects of after-the -war problems which bear seriously thinking over. It is when it comes down to prophecy that the *Engineer* mostly fails.

The article in question agrees that as a potential (*sic*) weapon of war the aeroplane will always retain importance, and so far as this aspect is concerned, the future of aeronautics and of aeronautical production is comparatively clear and certain. The prime factor in the matter will not be the actual production of aeroplanes in large numbers, but the provision of means whereby production in large numbers can be speedily undertaken. It would be folly, says our contemporary,—and we agree—to think that the country's peace-time aeronautical programme can be carried through on the same lines as its naval programme. Ships remain serviceable for a certain number of years after building, so that each year's output means a definite addition to strength. Aeroplanes, on the other hand, do not "keep." Again, the rate of wastage in war is so great that the peace-time provision of large numbers, however great, could never be made to take the place of active production on an intense scale after the outbreak of war. That country which had at its immediate command the best and most extensive resources for the production of aeroplanes in large numbers would have the decision in the end.

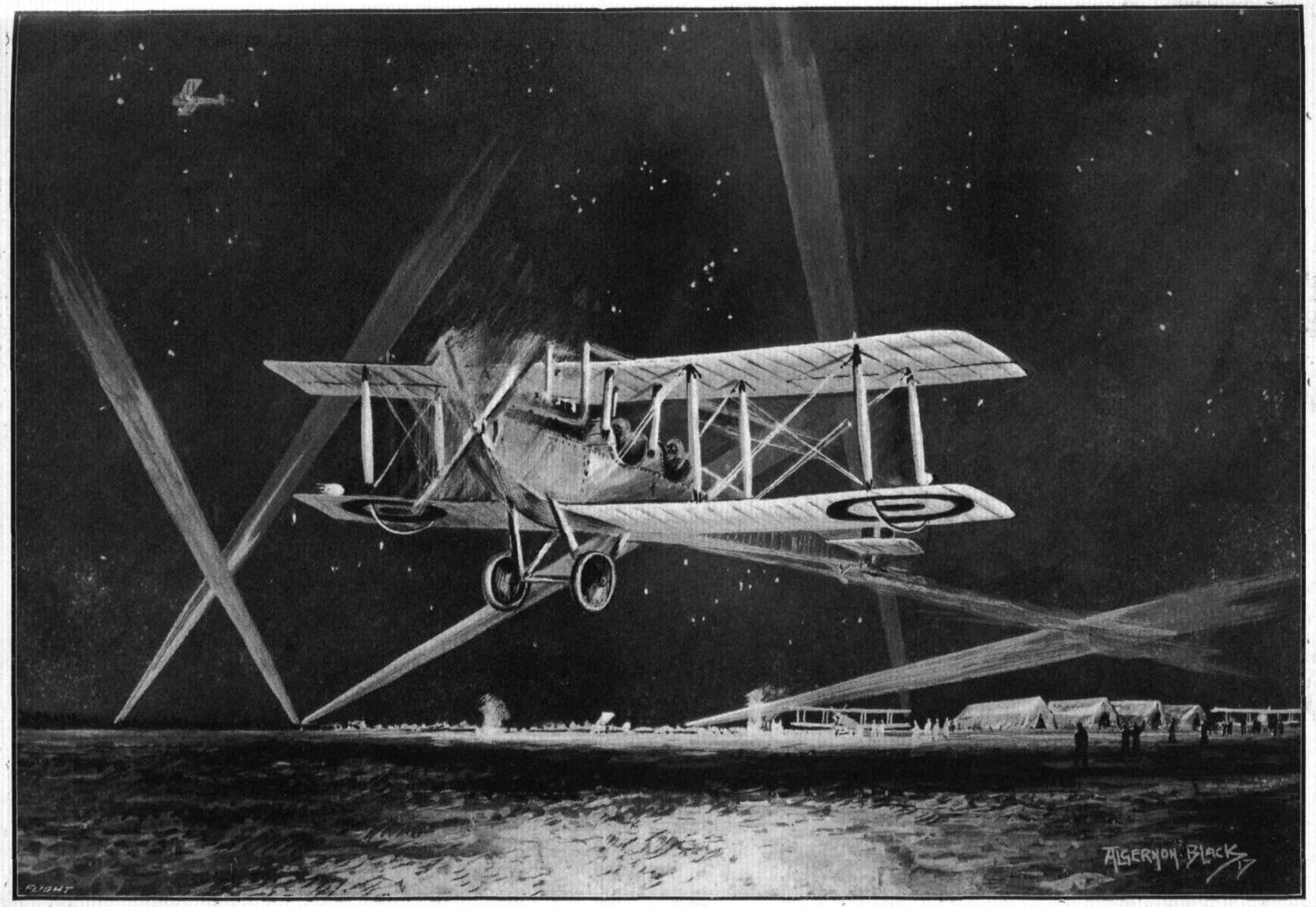
The *Engineer* then goes on to discuss very soberly the question of how our resources are to be co-ordinated so that on the outbreak of another war—assuming that the end of the present conflict does not bring a release from the burden of armaments—we may be in the position outlined above. After touching upon one or two nebulous possibilities, the point is made that the natural solution of the problem is that the peace-time employment of the aeroplane should be so fostered as to create a demand for aeroplanes for peaceful purposes equal or very nearly so to the numbers required in war-time. Then when war came the factories and the workers would be there ready to hand to take up the production of war machines on the scale necessary.

That, of course, is precisely what we ourselves hold and have held, and the same view is taken by every thinking person who has ever given the question a moment's consideration. And when we come to regard the future in the light of what has been done, and of what we know can be done, we are not in the least degree nervous about that future. It is here that we definitely part company with the *Engineer*. This is what the latter has to say about it :—

"Without a strong commercial demand for aeroplanes it will, we feel convinced, be impossible to keep the factories running on the extensive scale that the situation requires. Where such commercial demand is to come from, we must confess we cannot at present see. Doubtlessly the developments brought about by the war have incidentally vastly improved the commercial prospects of the flying machine, but we are far from being certain that even yet it is, under ordinary business conditions, a sound commercial means of transporting either passengers or goods. As a means of carrying bombs over from Belgium to be dropped on London, the Gotha is, perhaps, a satisfactory machine, but as a means of carrying, say 3 cwt. of goods, or two to five passsengers a like distance, it hardly appeals to us as a commercial proposition. The Atlantic journey has not yet been accomplished, but its ultimate performance is not open to reasonable doubt. Granting its possibility, wherein lies its commercial significance? The speed with which the journey would be accomplished could never justify commercially the employment of aeroplanes as a regular means of transatlantic transportation. Yet the speed factor is the only one that is primarily characteristic of this method of carrying goods or passengers. Time and progress of invention may yet alter all these considerations, and may yet establish the aeroplane as a peaceful means of travel or transportation of first-class importance. But as regards the present and the immediate future, we can say that the commercial prospects of the aeroplane are not very encouraging, and that just as during the past three and a-half years its production for war purposes has entirely eliminated all attention to its peace-time uses, so too, when peace comes, the lack of commercial outlet will probably very seriously interfere with its development and production as a potential weapon of war."

Of course it follows that "without a strong commercial demand it will be impossible to keep the factories running on the scale required." But it does not by any means follow that because, in our contemporary's view, the Gotha is a satisfactory machine for conveying bombs to be dropped on London it is not an equally satisfactory proposition for the carriage of 3 cwts. of goods for an equal distance. We should say that if the Gotha, or any other machine, can successfully carry three passengers and half-a-ton of bombs from Belgium to London, drop its bombs and get back safely with its passengers after running the gauntlet of the whole of the British defences, it had established at least some sort of a claim to be considered as being in the category of practical transport devices. As a matter of fact, there is left only one consideration remaining—that of cost. Provided the cost of running an aeroplane service is not prohibitive in comparison with other methods of transport, then it must, we submit, be agreed that such a service must be regarded as a commercial certainty. And we have had such figures laid before us by competent authorities as leave no room for doubt in the matter.

Again, why does the *Engineer* ignore such trivialities (!) as the Hendon–Constantinople flight, which was made by an all-British machine carrying a total load of *six tons*—not three hundredweights! Assuming that after the war we shall be in possession of machines capable of carrying a load of even five tons across



A NIGHT ASCENT.—A British night-flying biplane leaving in the light of a ground flare.

the Atlantic, does the *Engineer* think there is no future before commercial aviation? Then our contemporary speaks of the speed factor being the only one that is primarily characteristic of this method of transport, as though speed mattered not at all. Surely the *Engineer*, of all journals, should know something of the prime importance of speed. Has it forgotten the enormous developments that have taken place in engineering simply and solely as a result of the striving for a little more speed? Railways, shipping, mechanical transport of every kind, the mechanism of handling goods, and a dozen other examples which might be quoted, are there to point the moral that all engineering progress has been the outcome of a desire for speed and yet more speed. Why, then, speak of speed as though it were negligible as a factor in transport development.

But there is no need to pursue the matter farther. Our contemporary may possess its soul in patience, for it is no more likely to be right about the future of the aeroplane than it was when it said of the motor-vehicle in 1897:

"The motor car has yet to be made. It may be that it has not yet been invented. . . . And then after all comes the question—are motor cars wanted? Will there ever be so full a demand for them that money can be legitimately made out of their manufacture? There are not lacking those who assure us that the motor car has been slain by the tramcar and the bicycle. Time alone can settle the question."

We can safely let it go at that!

* * *

The Air Force. In a written reply to Mr. Joynson-Hicks the other day, Major Baird stated that the Air Force will be constituted as soon as the necessary administrative, financial and disciplinary measures have been completed. There has not been, he said, and will not be, any avoidable delay, and pending the completion of arrangements for the unification of the two air services their control will remain with the Board of Admiralty and the Army Council.

It is perfectly clear that the unification of two great Services cannot be accomplished in a day, and while it is doubtless necessary that a certain amount of vigilance should be displayed lest there should be any undue delay, we do not think anything but the embarrassment of the Government can be achieved by constantly worrying to know when this or that part of the unification is likely to be accomplished. We have a strong, able business man at the head of the Air Ministry whose task it is to see that the coalescing of the Air Services is brought about at the earliest possible moment consistent with fighting efficiency. From what we know of Lord Rothermere and his methods we do not imagine he is likely to tolerate delay that is avoidable, so that we are scarcely in sympathy with the people who require the city built in a night. Even Lord Rothermere does not possess Aladdin's lamp.

As an earnest that things are progressing, an Army Order has been issued notifying that the Administrative Wing of the R.F.C. has been abolished as from the 15th January. A Reserve Depôt, R.F.C., is to be formed which will deal with the training of recruits. The officer in charge of R.F.C. Records will, in addition to his other duties, be responsible for the final approval of recruits and for the transfer of rank and file to the Corps. Amendments have accordingly been made to King's Regulations.

The Flying Man's Career. Brigadier-General Hearson, who commands the Training Division of the R.F.C., had some interesting things to say to the students of the aeronautical section of the East London College last week. Speaking of the future of the Air Service, he said it would grow far beyond anything held in the imagination of people not directly connected with it, and not alone in numbers, but in power. "You have," he said, "in the Air Service tremendous possibilities for the individual, and my advice to you is to go into the finest and biggest service of the future and win."

It is quite clear the General Hearson is far from pessimistic about the future of aviation. As a matter of fact, he spoke as an enthusiast appealing to the imagination of the young men who will in the future constitute the *personnel* of the Air Service. As a rule, there is usually a tendency for the enthusiast to exaggerate the prospects of any movement or cause to which he is devoted, but in this case it is impossible for any charge of exaggeration to lie against the speaker. For who that has given the matter the least intelligent thought is prepared to gainsay the fact that the Air Service is destined to become, as General Hearson said, the "finest and biggest" service of them all? No one, we venture to say. For unless we are at the dawning of an era of complete disarmament and universal and everlasting peace, the Air Service will before long become our principal line of defence. That any such Utopian period is at hand we, for our own part, do not believe. We should be the better pleased if we thought differently, but if anyone thinks that one principal result of the present world-conflict is going to be the total wiping out of war as a means of settling international disputes, he is, we are firmly convinced, completely mistaken. So long as human nature remains as it is, and so long as the ultimate basis of communal life is physical force—as it is and must be—so long will the last appeal be to the *ultima ratio regum*. Nations will still act on the presumption that the best guarantee of peace is to be prepared for war, and armaments will be retained, possibly not on the same colossal scale as they had assumed prior to 1914, but still on a standard which will fall very far beyond the total disarmament visions of the Utopians. And aerial defence will be well in the forefront of preparation, since one of the principal lessons of the present war is that whoever controls the air can take a decision where and when he desires. In fact, in the years to come it will be found that air power is even more essential to national and imperial safety than sea-power, which in its turn connotes that we must have an air fleet as preponderatingly strong as the British Navy is to-day. Therefore, to pursue the question to its logical conclusion, it becomes perfectly clear that General Hearson said no more than the patent facts warrant and that the advice he gave to the students was eminently sound and to the point.

* * *

The Question of Man-Power. The whole mass of intelligent opinion of the country is behind the Government and its new Military Service Bill and against the selfish, unpatriotic attitude of certain of the skilled workers whose whole creed seems summed up in: "Everyone to his duty but us!" The plain facts of the situation are that we have arrived at the most critical period of the war, when Britain must put forth her supreme effort to hold the front until the American field armies can get properly going. Owing to the defection of

Russia from the Entente, the Germans are immediately able to put into line in the West a much greater number of men than the Allied General Staffs had reckoned upon. We and the French have had to detach very considerable bodies of troops to proceed to the assistance of our sorely beset ally, Italy. In addition, we still have on our hands three other campaigns of capital magnitude, at Salonica, in Mesopotamia, and in Palestine, all of which theatres of war make a steady demand upon our resources in man-power. In order to meet those demands, the War Cabinet is asking for 450,000 men in addition to those provided by the 1918 class of conscripts, who will automatically be called to the colours as they attain military age. As to the necessity of the demand, there is no question at all about that in the minds of those who know the position. When the number of German troops available from the Eastern front is balanced against known wastage of the Allies and the relative position in man-power compared with the figure of twelve months ago, the demands of the War Cabinet seem, if they err at all, to err on the side of moderation. As Mr. Lloyd George told Labour at the end of last week, we have got to find these men or be beaten. It is a case of "go on or go under."

This being so, what are we to think of that section of Labour which threatens to "down tools" unless the Bill is withdrawn; which holds out the threat to stop the essential output of shipping and aircraft in order that young men may remain securely in their well-paid jobs while their fathers and the twice or thrice wounded men are sent into the trenches to fight for them? We have seen the argument that there is an unfulfilled pledge that the "dilutees" of the engineering trades shall be taken for military service before the skilled men are called up. That, to our way of thinking, is mere sophistry. Supposing that pledge does exist, surely Labour and its leaders must realise that these are times in which circumstances alter cases. When it was given there was no thought in the minds of the Government that it would be necessary to proceed to extreme measures in the matter of man-power. The Russian revolution and its dire consequences had not materialised. Italy was not only holding her own, but was actually on the eve of embarking on an offensive which promised the most far-reaching results—and well-nigh achieved them. Surely it is obvious that this is not time for hair-splitting, but for every man of military age and physical fitness to come forward and do his plain duty to the State willingly and without compulsion.

There is a section of opinion—and thinking opinion at that—which believes that there is only one possible obstacle to victory. It believes that we shall win the war and secure the kind of peace we set out to obtain—if Labour does not let us down. For our own part, while we recognise that it is within the power of Labour to stultify all the efforts for victory which have been put forth by every class in the Empire, we have never believed that there was the remotest possibility of Labour turning traitor to the cause of freedom by refusing to do its plain duty. Nor do we think now that Labour as a whole is less patriotic than any other class of the community, or that we are likely to lose the war as a result of a wholesale betrayal of our cause by the workers. But unless there is an alteration in the attitude of certain sections of Labour *vis-a-vis* this question of military service we shall have to revise our articles of faith and that we should be loth to do without the clearest cause and justification.

Over and above the threats to strike, there are ugly stories about of attempts to stir up trouble in munition factories. These can be traced to the same root cause of desire to remain in well-paid employment rather than to face the risks of the trenches. We should hesitate to think, as some do, that German propaganda and German money is at the back of some of the trouble, but we do say that if that opinion is held the fomenters of trouble have only themselves and their methods to thank for it. Nothing has pleased us more than to hear that the Government is resolved to take the most extreme measures to put down all such attempts to retard the production of aircraft, munitions and ships. Whatever those measures may be, the Government will have the whole mass of decent public opinion, including 90 per cent. of Labour, behind its action. It may be that by the time these lines appear in print the Amalgamated Society of Engineers will have realised that, in the words of the Minister of National Service, persistence in their attitude will be met with such a blast of hatred and contempt as will surprise them. We trust it may be so, and that wiser counsels will prevail.

MAN POWER.

BACK of the beating hammer
By which the steel is wrought,
Back of the workshop's clamour
The seeker may find the Thought;
The Thought that is ever master
Of iron and steam and steel,
That rises above disaster
And tramples it under heel!

The drudge may fret and tinker
Or labour with lusty blows,
But back of him stands the Thinker,
The clear-eyed man who knows;
For into each plough or sabre,
Each piece and part and whole,
Must to the brains of Labour
Which gives the work a soul!

Back of the motor's humming,
Back of the belts that sing,
Back of the hammer's drumming,
Back of the cranes that swing,
There is the eye which scans them,
Watching through stress and strain,
There is the mind which plans them—
Back of the brawn, the brain!

Might of the roaring boiler,
Force of the engine's thrust,
Strength of the sweating toiler,
Greatly in those we trust;
But back of them stands the schemer,
The thinker that drives things through;
Back of the job—the Dreamer,
Who's making the dream come true!

(From the *American Machinist*.)

Late Searchlight Practice.

THE following official statement was issued on January 21st:—

"Although searchlight practice usually takes place for half-an-hour immediately after dark, it is often necessary, for various reasons, to exercise the lights at other times. The public should not assume, therefore, that a raid is taking place because the lights are showing at an unusual hour.

It is desirable that the police warning should be relied upon to give notice of a pressing danger, and that people should not put themselves to unnecessary inconvenience by taking cover without sufficient cause."

HONOURS.

Military Medals for the R.F.C.

IN the list of awards of the Military Medal for Bravery in the Field announced in the *London Gazette* of January 14th, the following appear :—

97613 Sergt. A. L. Corson, R.F.C.
5720 1st Air Mech. H. Doran, R.F.C.
10607 2nd Air Mech. J. W. Rookledge, R.F.C.

"Mentioned in Despatches."

INCLUDED in the list of names brought to the notice of the Secretary of State for War by General Sir Edmund Allenby, G.C.M.G., K.C.B., Commanding-in-Chief, Egyptian Expeditionary Force, for distinguished service in connection with military operations under his command are the following :—

Staff.

Capt. G. C. Anne, Yorks. L.I. and R.F.C.
Major (Temp. Lieut.-Col.) P. R. C. Groves, D.S.O., K.O. Shrop. L.I. and R.F.C.
Temp. 2nd Lieut. (Temp. Capt.) J. C. Macaulay, M.C., R.A. and R.F.C.

Royal Flying Corps.

Capt. (Temp. Maj.) C. W. Anstey, S. Wales Bord. ; Lieut. F. A. Bates, Yeo. ; Lieut. H. F. Blake, S.R. ; Capt. (Temp. Lieut.-Col. in Army) H. Burchall, S.R. ; Capt. (Temp. Lieut.-Col.) A. E. Borton, D.S.O., R. Highrs. ; Lieut. H. J. Buchanan-Woolaston, Yeo. ; Maj. (Temp. Lieut.-Col.) A. D. Carden, R.E. ; 2nd Lieut. (Temp. Lieut. in Army) J. H. Muller, Midd'x. R. ; Capt. L. L. Maclean, Gurkha Rif., I.A. ; Capt. (Temp. Maj. in Army) J. R. McCrindle, M.C., Gord. High. ; Temp. 2nd Lieut. (Temp. Maj.) G. H. Padley, Gen. List ; 2nd Lieut. R. C. Steele, D.S.O., S.R. ; 2nd Lieut. (Temp. Capt. in Army) The Hon. P. M. Thesiger, Yeo. ; No. 5865 Sergt. E. Clay ; No. 3090 Sergt. (Acting Flight Sergt.) C. C. Gissing ; No. 3931 Sergt. (Acting Flight Sergt.) E. Hewitt ; No. 1363, Sergt. E. G. Hone ; No. 8520 1st Class Air Mech. D. W. W. Jakes ; No. 63 Sergt.-Maj. A. E. Lewis ; No. 49722 1st Class Air Mech. W. B. Richardson ; No. 3345 Corp. L. L. J. Thompson.

Australian Flying Corps.

Lieut. F. W. F. Lukis ; Lieut. D. T. W. Manwell ; Lieut. C. de C. Matulich ; Lieut. S. I. Winter-Irving ; Maj. R. Williams, D.S.O.

No. A 274 1st Class Air Mech. A. Balflour ; No. A 450 2nd Air Class Air Mech. A. R. Betteridge ; No. A 1393 2nd Class Air Mech. W. J. Hawkes ; No. A 166 Corp. A. B. Payne ; No. A 123 1st Class Air Mech. W. E. Peverill ; No. A 237 2nd Class Air Mech. H. Shepherd ; No. A 104 Flight Sergt. T. Watkins.

Honours for the R.F.C.

IT was announced in the *London Gazette* of January 18th, that the King has been pleased to confer the following rewards for gallantry and distinguished service in the Field. The acts of gallantry for which the decorations have been awarded will be announced as early as practicable :—

Military Cross.

Lieut. (Temp. Capt.) B. P. G. Beanlsnds, Hamps. and R.F.C. ; Temp. 2nd Lieut. R. R. Bentley, Gen. List and R.F.C. ; Temp. Lieut. P. T. Carden, Gen. List and R.F.C. ; Lieut. (temp. Capt.) R. M. Charley, R.F.C. (S.R.) ; 2nd Lieut. C. G. Fenton, R.F.C. (S.R.) ; 2nd Lieut. H. Hammond, Dorset and R.F.C. ; Lieut. (temp. Capt.) H. Hewett, R. Berks and R.F.C. ; Lieut. F. H. Holmes, R.E. and R.F.C. ; Temp. 2nd Lieut. H. Howard, attd. N'land F. and R.F.C. ; Lieut. G. R. Hunter, Cam. Hrs., attd. R.F.C. ; Lieut. (temp. Capt.) C. T. Lally, R.F.C. (S.R.) ; Lieut. A. Mann, A.S.C. and R.F.C. ; Lieut. (temp. Capt.) C. E. H. Medhurst, R. Innis. F. and R.F.C. ; 2nd Lieut. P. J. Moloney, R.F.C. (S.R.) ; Temp. 2nd Lieut. C. F. Nathan, Gen. List and R.F.C. ; Lieut. E. T. Owles, R. Ir. F. (S.R.) and R.F.C. ; Temp. Lieut. (temp. Capt.) A. H. Peck, Gen. List and R.F.C. ; Lieut. S. J. Quine, Ches. (S.R.) and R.F.C. ; Temp. 2nd Lieut. K. G. Selanders, Gen. List and R.F.C. ; Temp. 2nd Lieut. D. H. Sessions, Gen, List and R.F.C. ; Temp. Lieut. (temp. Capt.) J. B. Solomon. Ox. and B. L.I. and R.F.C. ; Temp. Lieut. A. J. Tyler, Gen., List and R.F.C. ; Lieut. (temp. Capt.) J. L. Vachell, R.F.A., attd. R.F.C. ; 2nd Lieut. (temp. Lieut.) L. B. Williams, Gen. List and R.F.C. ; Lieut. J. H. G. Womersley, R.G.A. and R.F.C. ; Capt. and Flight. Commander S. I. Winter-Irving, Aus. F.C.

Amendments.

The following is the correct description of a non-commissioned officer on whom a reward has recently been conferred :—

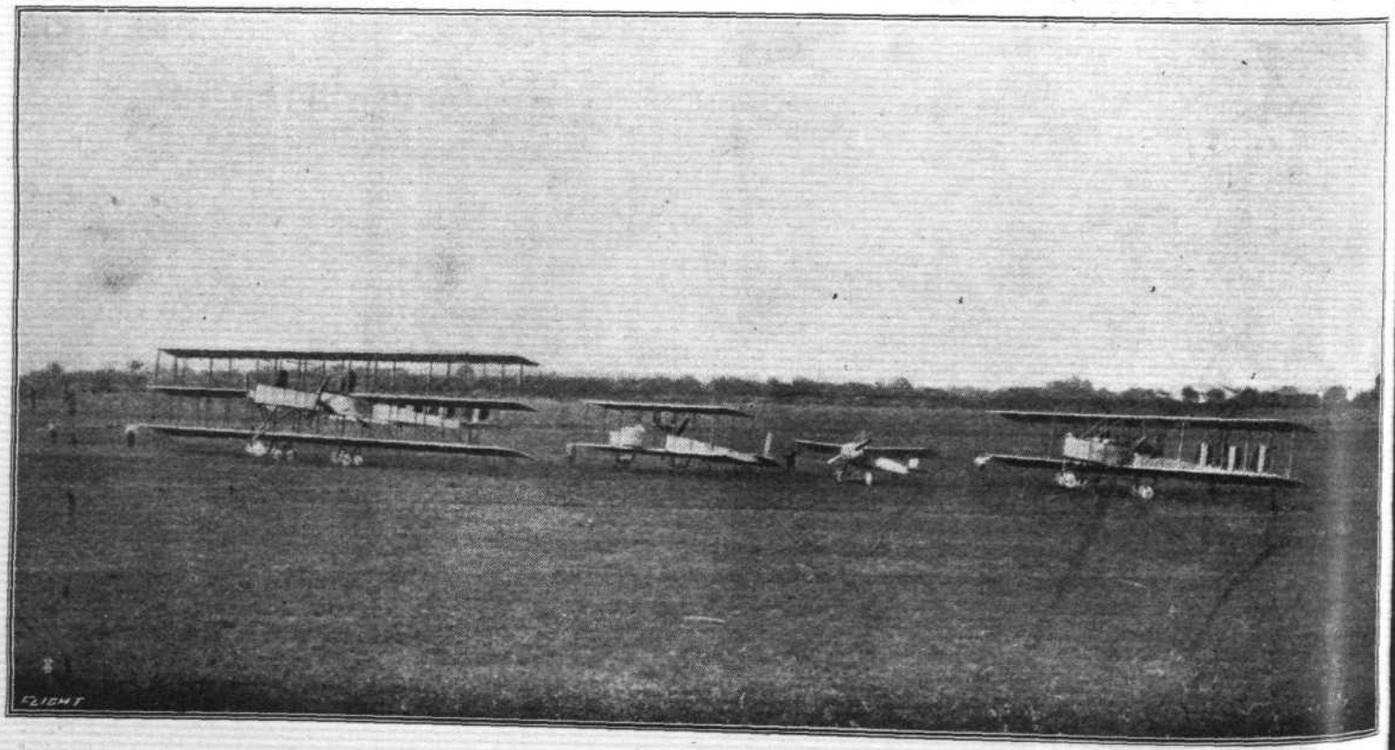
2105 Sergt. S. J. Clinch, R.F.C. (D.C.M. gazetted November 19th, 1917).

Reorganisation of the R.F.C.

AN Army Order issued on January 15th announces the abolition of the Administrative Wing of the R.F.C. from January 15th, 1918.

A Reserve Depôt, Royal Flying Corps, will be formed, which will deal with the training of recruits of the Royal Flying Corps.

The Officer in charge Royal Flying Corps Records will, in addition to his other duties, be responsible for the final approval of recruits, and for the transfer of rank and file to the Royal Flying Corps.



Caproni machines "in contrast." *From "Rivista dei Transporti Aerei*

FLIGHT

THE 260 H.P. MERCEDES AERO ENGINE.

(*Continued from page 72.*)

Carburettor and Induction System.—Notwithstanding the large size of these engines only one carburettor is employed ; this is situated low down at the rear end of the crankcase. Below the float chamber is attached a petrol filter chamber, the petrol entering through a gauze cylindrical filter tube, which is screwed into the top filter chamber as shown in the sectional drawing (Fig. 19). Petrol enters the bottom of the float chamber, which is of the ordinary balanced needle valve type. The main jet, which is a plain tube with an orifice of 2.33 mm. diameter, is situated in the centre of the intake pipe, inside the choke tube. The choke tube is 32 mm. in diameter at the waist and 54 mm. at the largest diameter, top and bottom. The throttle valve, which is of the barrel type, is 80 mm. in diameter and is mounted on ball bearings at each end ; the races are 35 mm. in diameter and are supported in recesses turned in the end covers of the gun-metal throttle valve liner, which is pressed into the cast aluminium body of the carburettor.

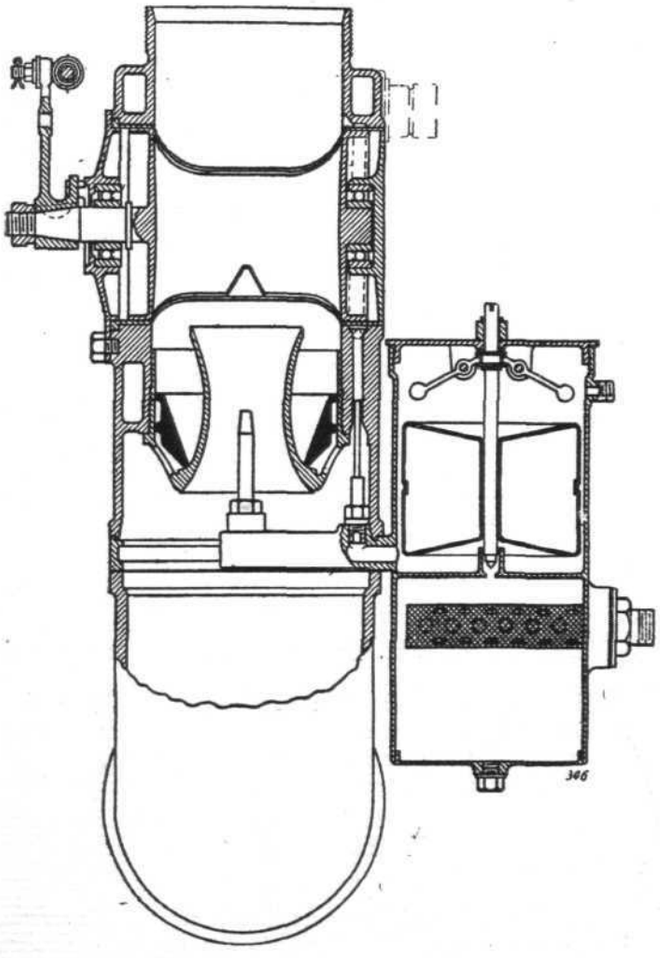


Fig. 20.—Arrangement of carburettor.

The dimensions of the semi-elliptical ports in the throttle valve are 80 mm. long by 50 mm. wide at the bottom side and 80 mm. by 55 mm. at the top. The pilot jet, which is the same length as the main jet, is .89 mm. bore at the orifice. It is situated at the side of the intake passage, and communicates with an annular groove machined around the outer end of the throttle valve liner in the body of the carburettor. From this annular channel a passage communicates with the induction pipe just above the throttle valve, which when closed draws air through a V slot cut in the barrel of the throttle. A conical suction valve supplies extra air automatically through eight holes 14 mm. in diameter drilled in the annular seating which surrounds the base of the choke tube. Air is taken into the carburettor, as already mentioned, from the interior of the air chamber cast in the base chamber. The diameter of the air intake passage is 100 mm., and it extends inside the crankcase to the centre of the engine.

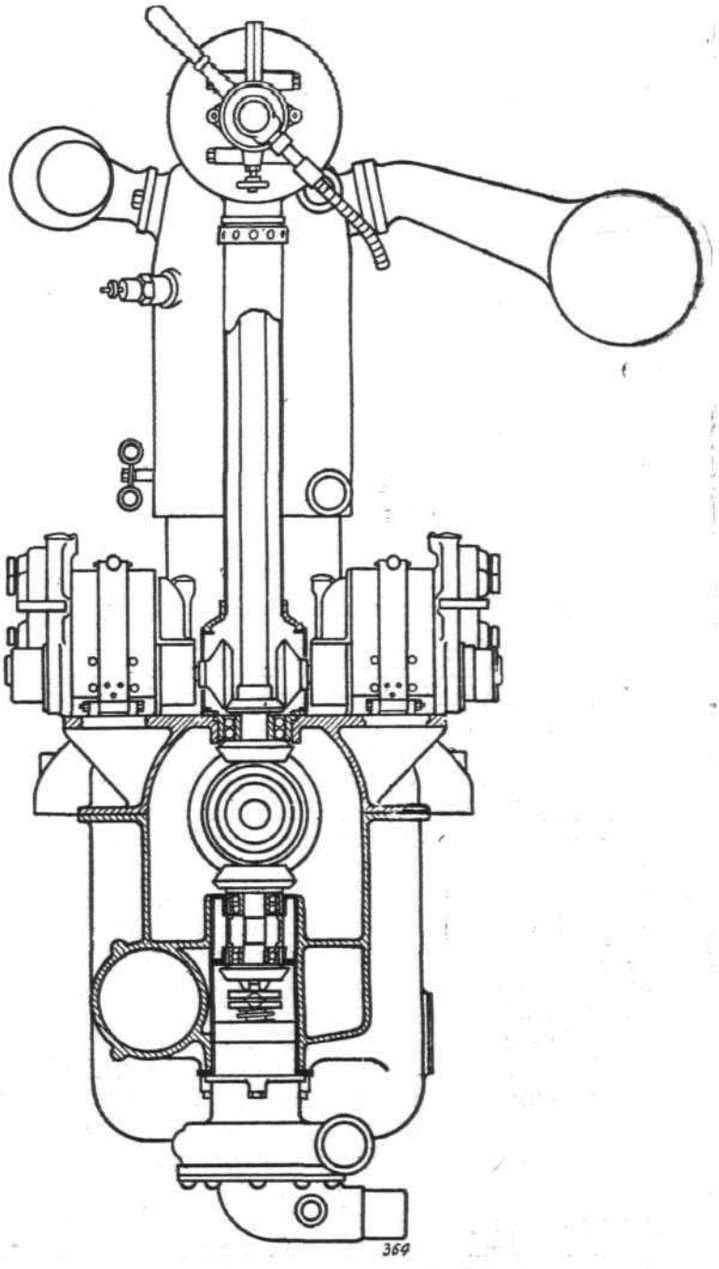


Fig. 21.—Arrangement of camshaft vertical drive.

Induction Pipe.—The diameter of the induction pipe at its joint with the carburettor is 70 mm. ; this diameter increases to 100 mm. as it leads upwards to the engine in a right angle bend, which is lagged with asbestos cord. The throttle valve is water heated by pipes leading from the main water circulation pipe to a water space cast in the body of the carburettor around the throttle valve. No device for altitude adjustment is provided on the engines examined. The design of the induction pipe is

interesting ; the gas is led to the centre of the engine by the 100-mm. pipe : the gas then enters a branch pipe 70 mm. in diameter through a port 100 mm. in diameter. Thence the two branch induction pipes lead outwards to the six inlet ports of the cylinders, which are 85 mm. long and 50 mm. wide.

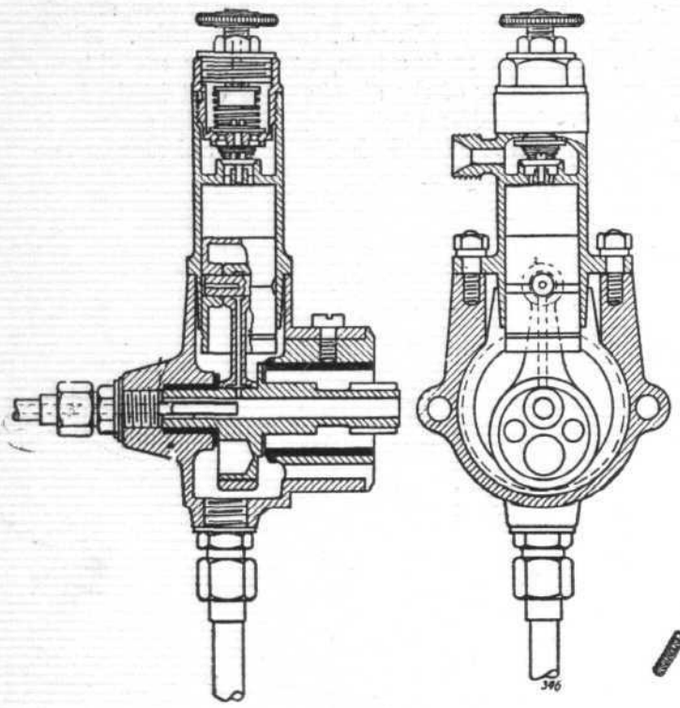


Fig. 22.—Arrangement of air pump.

Ignition.—Two Bosch magnetos, type Z.H.6, are mounted on a transverse bracket at the rear end of the crankcase, one being a starter magneto, used in conjunction with a hand starter dynamo. The magnetos are driven direct by bevel gears off the vertical camshaft driving shaft, the direction of rotation being anti-clockwise in both cases. The arrangement of the magneto driving gear is shown in the cross-sectional drawing (Fig. 6). All 12 sparking plugs are fitted on the inlet side of the engine, and are situated directly below the inlet valves ; the H.T. wires are carried in two fibre tubes attached to the sides of the cylinders on the inlet side.

Air Pump.—Details of the air pump are given in the scale sectional drawings, Fig. 23. The air pump is driven off the front end of the camshaft, the bore being 26 mm. and the stroke 27 mm. An adjusting screw is fitted above the release valve of the pump for regulating the strength of the spring, the released pressure being taken through the hollow stem of the adjusting screw. An oil trap is provided just below the air pump to retain any surplus oil which may find its way past the air pump valve and into the pressure pipe.

Water Pump.—The water pump extension shaft is driven through a vertical shaft off a bevel gear on the end of the crankshaft, and in the same vertical axis as the camshaft driving shaft ; it is attached by a flange to the bottom of the sump, next to the oil pump. The constructional details of the water pump are given in the sketch (Fig. 24). The pump is of the centrifugal type, employing a rotary vane disc, the water entering below the bottom flanged cover through a 44-mm. port, below the rotor, and the water is delivered centrifugally from the vanes between the top and bottom of the rotor, which is also fitted with vanes upon its top side to throw the water away from the spindle. Instead of packing glands, a hardened steel friction washer is let into a recess machined in the upper face of the rotor, and is kept in uniform contact with the face of the phosphor-bronze spindle bush by the action of a light spring, which is fitted under a ball thrust race at the driving end of the spindle. The diameter of the outlet passages from the water pump to the cylinders is 44 mm. Double inlet water connections between each of the six cylinders supply the water jackets at top and bottom, the diameter of the steel water circulation being 40 mm.

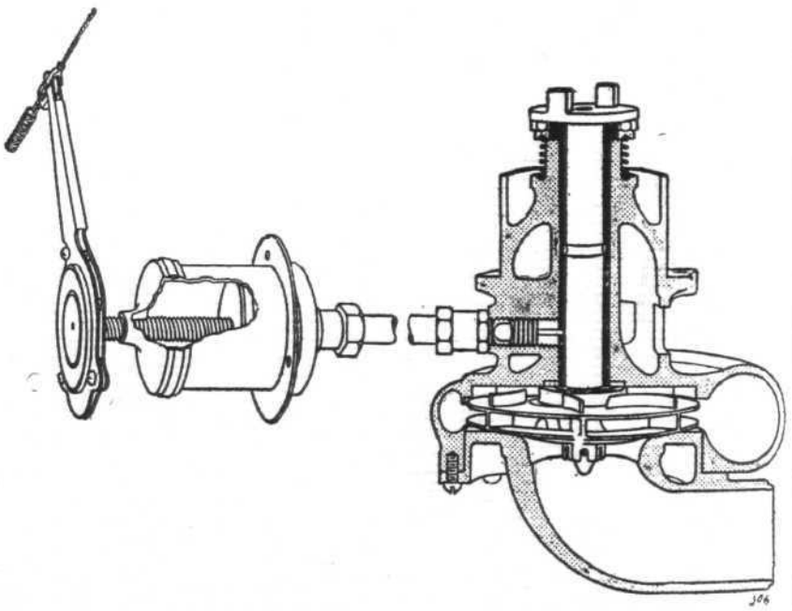


Fig. 23.—Water pump, with greaser and its actuating ratchet.

(*To be concluded.*)

Fatal Accidents.

WHEN Lieut. Wise and Lieut. Payne, of the R.F.C., were starting on a flight at Hendon Aerodrome on January 13th, the machine caught fire, and both officers received injuries, from which they died.

At an inquest on January 15th on 2nd Lieut. A. McDowall, E. Lanc. Regt., attd. R.F.C., who was killed on January 12th, by a fall from a balloon, a verdict of " Accidental death " was returned. It was stated in evidence that the balloon in which Lieuts. Dean and McDowall were observing, lost its stability through an unknown cause, and fell across the cable of another balloon, cutting the suspenders of the basket. Mr. Dean jumped clear with his parachute, but Mr. McDowall got entangled in the rigging on the other side of the car, and fell 800 ft. to the ground, being killed instantly.

Three R.F.C. officers were killed in an aerial collision on January 19th in the vicinity of an aerodrome. Their names are : 2nd Lieut. L. Macdonald, who was piloting a single-seater, 2nd Lieuts. C. E. Rowley and W. R. Bailey, pilot and observer of the second machine. There was a strong breeze blowing at the time, and the atmosphere was rather hazy, but details are lacking as to how the machines came together.

While an aeroplane was passing at a fair height over Martins Road, Shortlands, Beckenham, on January 19th, one wing apparently doubled up, and the machine, turning rapidly over and over, crashed on to the top of some houses. The occupant of the machine, Captain Sharples, when picked up was found to be dead. At the subsequent inquest a verdict of " Death from Misadventure " was returned.

While flying over Salisbury Plain, on Jan. 11th, Lieut. G. Heasman, R.F.C., was killed.

THE ROLL OF HONOUR.

REPORTED by the Admiralty:—

Previously Missing, now reported Killed.

Flight Sub-Lieut. L. E. Adlam, R.N.

Accidentally Killed.

Flight Sub-Lieut. C. R. Barber, R.N.
Observer Sub-Lieut. H. R. Fasby, R.N.

Died of Wounds.

Flight Sub-Lieut. H. Willis, R.N.

Died.

Paymaster W. Cubbin, R.N.
The Rev. J. D. Dathan, M.A., Chaplain, R.N.
Lieut. R. B. Robinson, R.N.V.R.
Engineer Lieut. A. J. O. Trew, R.N.R.

Drowned.

Flight Sub-Lieut. C. E. Fox, R.N.
Observer Sub-Lieut. A. Gordon, R.N.
Flight Observer W. B. L. Jones, R.N.
Flight Sub-Lieut. G. H. Phillips, R.N.

Died while Prisoner in Germany.

F. 15990 Aircraftman, 2nd Class, W. C. Danzey, R.N.A.S.

Accidentally Injured.

Prob. Flight Officer P. H. D. Blackman, R.N.
Flight Sub-Lieut. D. B. G. Francis, R.N.

Previously Missing, now reported Prisoner.

Flight Sub-Lieut. H. P. Salter, R.N.
Observer Sub-Lieut. H. W. White, R.N.

Reported by the War Office:—

Killed.

2nd Lieut. A. M. Anderson, R.F.C.
Lieut. R. B. Cameron, R.F.C.
2nd Lieut. J. N. Cash, R.F.C.
2nd Lieut. R. H. Curtis, R.F.C.
2nd Lieut. F. A. Egner, R.F.C.
Capt. R. L. M. Ferrie, M.C., R.F.C.
2nd Lieut. R. V. Garbett, R.F.C.
2nd Lieut. H. P. J. G. Hamel, R.F.C.
2nd Lieut. P. H. Lawson, R.F.C.
2nd Lieut. G. C. Read, R.E., attd. R.F.C.
2nd Lieut. B. R. Raggett, R.G.A., attd. R.F.C.
Capt. R. Reeder, Manch., attd. R.F.C.
Capt. G. B. Syddall, Manit., attd. R.F.C.
2nd Lieut. L. C. S. Tatham, R.F.C.
2nd Lieut. G. R. Vickers, R.F.C.
2nd Lieut. H. Walsh, R.F.C.
98079 1st Air-Mech. D. W. Clement, R.F.C.
67601 2nd Air-Mech. W. H. Roberts, R.F.C.
8399 1st Air-Mech. F. Rothwell, R.F.C.

Previously reported Accidentally Killed, now reported Killed.

Lieut. W. N. Scott, R.F.C.
Capt. H. H. Storrer, R.F.C.

Died of Wounds.

Lieut. J. S. Macaulay, R.F.C.

Previously Missing, now reported Died of Wounds as Prisoner in German hands.

2nd Lieut. S. E. Stanley, R.F.C.

Previously Missing, now reported Killed.

Lieut. A. O. MacNiven, H.L.I., attd. R.F.C.

Previously Missing, now reported Missing, believed Killed.

769 Sergt. T. F. Stephenson, R.F.C.

Previously Missing, now reported Killed or Died of Wounds.

Lieut. G. A. Cockburn, Can. F.A., attd. R.F.C.

Accidentally Killed.

Lieut. W. K. Anderson, E. Ont., attd. R.F.C.
Lieut. F. A. Wood, Cent. Ont., attd. R.F.C.
28025 1st Air-Mech. M. R. Muir, R.F.C.

Died.

14489 2nd Air-Mech. R. C. Guthrie, R.F.C.
35089 1st Air-Mech. H. Garner, R.F.C.
P 144 Sergt. F. F. Piper, R.F.C.
142 C. L. Gent, Aus. F.C.

Wounded.

2nd Lieut. G. R. Barry, R.F.C.
Lieut. R. S. S. Brown, R.F.C.
2nd Lieut. E. H. Church, R.F.C.
Lieut. L. R. Clark, Aus. F.C.
2nd Lieut. C. Davies, R.F.C.
2nd Lieut. H. Erskine, R.F.C.
2nd Lieut. G. W. Ferguson, M.C., R.F.C.
2nd Lieut. S. Groseberg, R.F.C.
2nd Lieut. N. E. Gwyer, R.F.C.
2nd Lieut. L. Lambe, A.S.C., attd. R.F.C.
Lieut. M. P. Lewis, R.F.C.
Lieut. T. Owen, S. Staffs., attd. R.F.C.
2nd Lieut. R. A. MacLaren, R.F.C.
2nd Lieut. H. Morley, R.F.C.
Lieut. E. G. Pole, A.S.C., attd. R.F.C.
Capt. R. H. Rusby, Glouc., attd. R.F.C.
2nd Lieut. C. D. Skinner, R.F.C.
2nd Lieut. A. E. Thornhill, R.F.C.

The following, except where otherwise indicated, are mechanics in the R.F.C., the figure in brackets indicating the grading.

8382 (1st) Air-Mech, W. L. Craven; 7773 (1st) Air-Mech. H. R. Deane; 65092 (2nd) Air-Mech. N. E. Deberdon; 2761 Sergt. J. H. Dollittle; 7365 Cpl. G. W. Fleet; 44573 (2nd) Air-Mech. A. G. Gibbs; 2015 Sergt. F. Hopper; 8837 (1st) Air-Mech. C. H. Vaughan.

106000 (3rd) Air-Mech. J. D'Arcy; 43692 (2nd) Air-Mech. S. C. Davison; 106046 (3rd) Air-Mech. R. Jameson; T2 14660 (2nd) Air-Mech. G. Lawrence; 75209 (2nd) Air-Mech. J. Littlejohn; 103141 (2nd) Air-Mech. S. A. Moss; 43691 (2nd) Air-Mech. W. G. Worsdall.

274a A. Balfour, Aus. F.C.; 503 C. Cooper, Aus. F.C.

Previously Missing, now Reported Wounded and Prisoner in German hands.

Lieut. J. P. McRae, Can. A.S.C., attd. R.F.C.

Missing.

2nd Lieut. A. Butt, Bedf. attd. R.F.C.
2nd Lieut. E. S. Davenport, R.F.C.
Capt. R. Erskine, R.F.C.
2nd Lieut. K. P. Ewart, R.F.C.
Capt. A. W. Field, R.F.C.
Capt. H. R. Hewett, Berks., attd. R.F.C.
2nd Lieut. C. W. Leggatt, R.F.C.
2nd Lieut. V. J. Parkinson, Aus. F.C.
Capt. E. E. Pope, R.F.C.
2nd Lieut. J. D. Potts, Aus. F.C.
2nd Lieut. R. E. Robb, R.F.C.
Lieut. A. Rowan, K.R.R., attd. R.F.C.
Capt. F. H. B. Selous, M.C., R.W.Surr., attd. R.F.C.
2nd Lieut. W. S. Smith, W. Yorks., attd. R.F.C.
Lieut. R. C. Sotham, R.W. Kent, attd. R.F.C.
2nd Lieut. R. J. G. Stewart, R.F.C.
2nd Lieut. A. N. Westlake, M.C., N. Staff., attd. R.F.C.
2nd Lieut. A. F. Wynne, K.O.Y.L.I., attd. R.F.C.

44969 (2nd) Air-Mech. F. H. Bastick, R.F.C.; 7700 (1st) Air-Mech. W. S. Crust, R.F.C.; 49929 (2nd) Air-Mech. T. H. Hoggard, R.F.C.; 5701 (1st) Air-Mech. J. Partridge, R.F.C.; 50506 (2nd) Air-Mech. T. L. Quinn, R.F.C.; 56069 (2nd) Air-Mech. A. E. Wrapson, R.F.C.

3217 Sergt. M. H. Everix, R.F.C.; 45286 (2nd) Air-Mech. W. Holman, R.F.C.

Previously Missing, now reported Prisoners in German hands.

Capt. G. B. Crole, M.C., R.F.C.
2nd Lieut. R. E. Dusgate, R.F.C.
Capt. D. B. King, R.F.C.
2nd Lieut. R. Main, R.F.C.
2nd Lieut. J. P. Morgan, R.F.C.
Lieut. K. S. Morrison, R.F.A., attd. R.F.C.
2nd Lieut. Archibald Muir, R.F.C.
2nd Lieut. L. G. Nixon, R.F.C.
2nd Lieut. L. W. Timmis, R.F.C.
Lieut. H. Whitworth, Sher. For., attd. R.F.C.

Previously Missing, now reported Prisoners in Austrian hands.

2nd Lieut. J. A. M. Robertson, R.F.C.

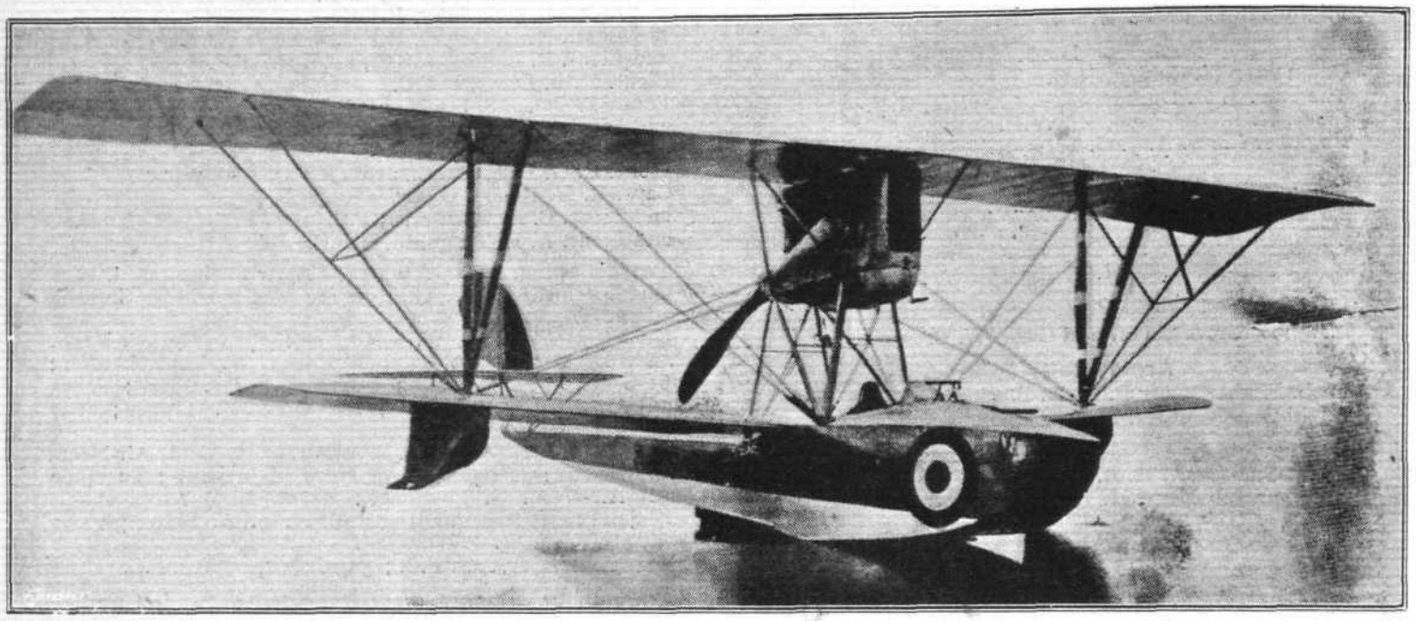
Correction: **Missing.**

2nd Lieut. C. S. Reed, R.F.C. (reported Missing), *should read* 2nd Lieut. C. S. Read, R.F.C.

FROM OTHER LANDS.

THE ITALIAN "MACCHI" FIGHTING FLYING BOAT.

THE Macchi single-seater fighting aeroplane is one of the most efficient flying boats ever built. Owing to the fineness of its construction, its light weight, and high-powered motor, it is able to ascend to an altitude of 13,000 ft. in only 18 minutes. In a single-seater fighting machine quick climb is, of course, one of the most important essentials of performance, although this adaptability to climbing rapidly is not generally associated with machines of the flying boat class.



From "Aerial Age" (U.S.A.).

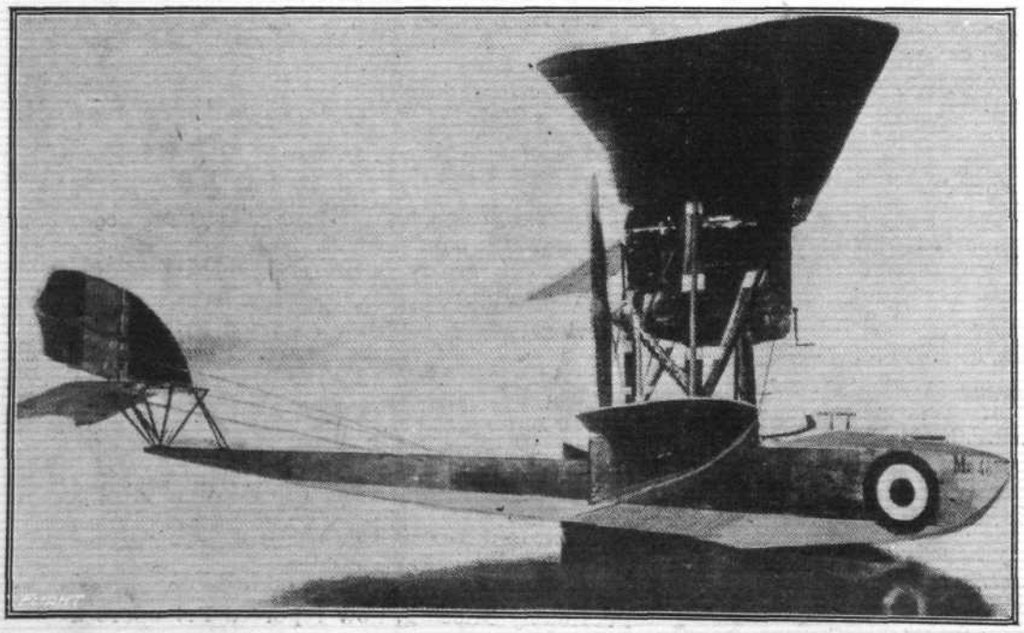
The Italian "Macchi" flying boat, equipped with a 200 h.p. engine.

Head resistance has been reduced to a minimum, especially in regard to interplane bracing. The struts and interplane bracing is similar in principle to that employed in the French Nieuport scout—the single pair of V-struts, the narrow lower plane, and the outline of the planes themselves bear a resemblance to the Nieuport. The Macchi is provided with steel tube overhung braces, because of the area extending beyond the interplane struts.

The overall dimensions of the machine are: Span, 39 ft. 4$\frac{7}{16}$ ins.; overall length, 27 ft. 3 ins.; overall height, 9 ft. 10$\frac{1}{16}$ ins. There is a lifting surface of 301 square ft., and the loading per square ft. is 6.85 lbs. When empty the machine weighs 1,510 lbs. When fully loaded to its gross weight of 2,060 lbs., the military weight is distributed as follows: Petrol and lubricating oil, 265 lbs.; pilot, 175 lbs.; two Fiat machine guns, both firing forward, 110 lbs. Total weight of useful load carried, 550 lbs. Near the surface of the water the machine can travel at a rate of 112 m.p.h. In the first four minutes it can climb to 3,250 ft.; eight minutes, 6,500 ft. twelve and one half minutes, 10,000 ft. Sufficient petrol and oil is carried for an air endurance of three hours.

The Isotta-Fraschini engine, with which the Macchi boat is equipped, is known as the V4B. This is a six-cylinder vertical type with nominal h.p. of 150 and a bench-test normal h.p. of 190 at 1,400 r.p.m. Bore, 5.2 ins; stroke, 7.1 ins. Overall dimensions of the V4B—length, 5 ft $\frac{5}{16}$ ins.; height 3 ft. 3$\frac{1}{4}$ ins.; width, 2 ft. 3$\frac{15}{16}$ ins. Carburettors, Zenith; magnetos, Marelli. The weight of the engine complete, dry, is 573 lbs. Its weight per b.h.p. is 3.01 lbs.

Petrol is consumed at the rate of 8.82 oz. per hour; oil consumption per b.h.p., .7 oz.—*Aerial Age* (U.S.A.)



Courtesy "Aerial Age" (U.S.A.).

Side view of the Italian "Macchi" flying boat.

FLIGHT
THE AIRCRAFT WEEKLY

REVIEWS.

"An Airman's Wife."

THE advice of a certain editor who wanted to get a personal account of any incident by one who was there but was not a professional writer was "Go away, forget all about me and the paper, and then sit down and write a letter to your sister, or wife, telling her all about it." It is, indeed, good advice, and has led to the production of many an interesting article. In "An Airman's Wife" we get the idea, double distilled as it were, for the letters, which largely make up the volume, were written by a journalist—Captain William Bond—to his wife. Captain Bond, who alas, has "gone west," used to write to his wife, if possible, every day, and in these little notes we get glimpses of the pilots' daily round at the front. Everything, whether exploits in the air—Captain Bond had won the Military Cross and bar—or the common incidents of the aerodrome, is told in a calm deliberate style without any garnishings of journalese, and it is for those letters from "Bill" that many will value the book.

There are many of them which one would like to quote, but where could one stop? Better to get the book and read them—one and every one. The gaps between the letters are filled in with the touch of a "craftsman" by Mrs. Bond, so making the narrative a continuous one from the time Captain Bond starts for the front to the time when news comes through of his being posted as missing. Although he lives to the end, in Mrs. Bond's book, in fact he was killed.

The book is published by Herbert Jenkins at 5s. net.

"Tommy's Tunes."

IT is with great pleasure that we have received the second edition of "Tommy's Tunes," that excellent collection of "Soldiers' Songs, Marching Melodies, Rude Rhymes and Popular Parodies" which Mr. F. T. Nettleingham got together while he was on active service with the R.F.C. in France. The success of the first edition was so immediate that unfortunately the new edition had to be got out so quickly that there was little time to incorporate new matter. "Tommy" is an inveterate improviser, and wherever soldiers have been in camp or billet they have produced songs and rhymes far beyond the power of one man to obtain. To remedy this, it is to be hoped, therefore, everyone who can will for the future take the trouble to jot down the words of anything in the line which they come across, and send them to Mr. Nettleingham, so that the next edition may be even more complete. As it stands, however, the book contains a very comprehensive collection. Naturally, the author has a good many relating to his own corps, but his net has been cast wide and every branch of the service is represented. Of course there is much material which does not lend itself to rendering in cold print, but Mr. Nettleingham has taken the broad view and included many pieces which, although at first glance, may appear a little out of taste yet they do reflect facets of active service which it is as well to know. It is difficult to quote from a book such as this but the "Mechanic's Rosary," sung to the tune of "My Mother's Rosary," will give an idea of the sort of things the R.F.C. parodies.

THE MECHANIC'S ROSARY.

There's an awful noise at times
Comes from out our planes.
Jim—'e calls it 'orrid names,
Says it gives 'im pains
Without any rhyme,
Without any prose.
One can never get the blamed thing to go;
But ten great big cylinders,
And ten great big valves:
You'll take them out,
You'll put them in,
And when your daily work is done,
You'll count them each and every one—
That is *your* Rosary.

As to the general field which the "Tunes" cover, we cannot perhaps do better than reproduce the following dedication of the compiler "To Those who Sang and Fought and Died."

To
You that have sung,
You that have laughed,
You that were happy
Amateurs at warcraft,
Amateurs all.

To
You that have cursed,
You that have prayed,
You that have joked,
And, joking, were laid
Side by side,
Britons all.

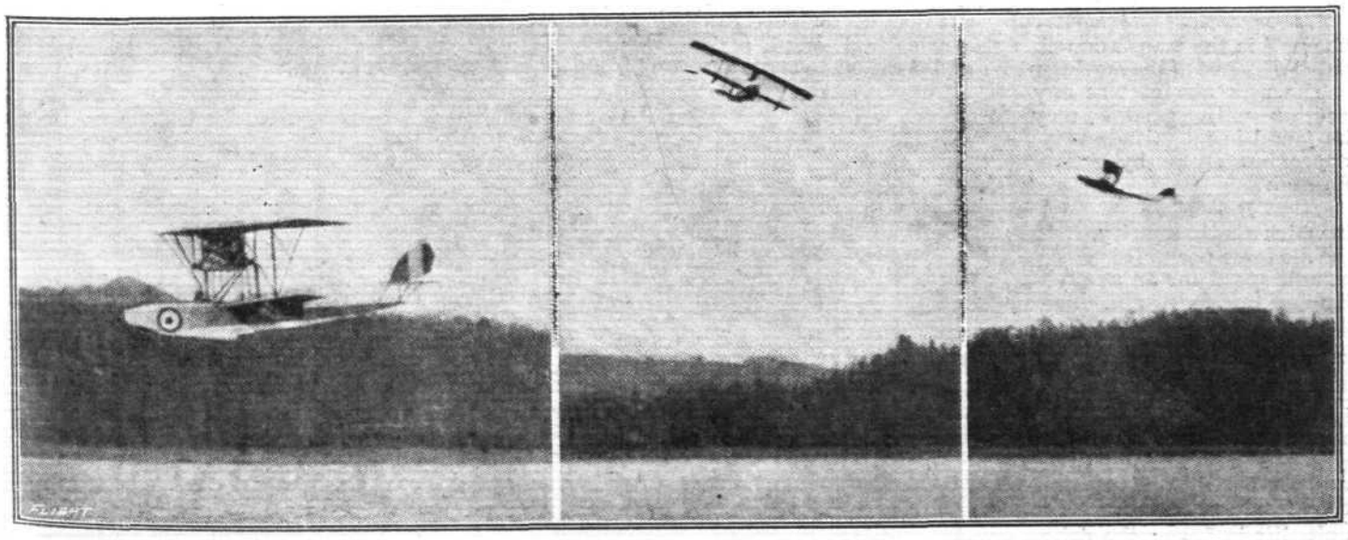
Your songs were ribald,
Your rhymes were rude,
Your ditties doubtful,
Your quips quite crude,
But you fought,
Heroes all.

The book is published by Erskine Macdonald, Ltd., and the price is 2s. 6d. net.

Elementary Mathematics and Wireless Telegraphy.

FOR some time there has existed a pressing need for a specialised volume of elementary mathematics to enable students of fair education to continue their mathematical studies along the lines necessary for wireless work, without over-burdening themselves with matter of no immediate practical use. Mr. S. J. Willis, in a book which has been published by the Wireless Press, Ltd., admirably fills the gap. He strikes a happy medium, presuming on the one hand that the student is sufficiently well acquainted with arithmetic not to need any preliminary instruction in that part of the work, and, on the other, that he has probably forgotten much of the elementary algebraic work he learnt at school. The price is 3s. 6d. net.

◈ ◈ ◈ ◈



Courtesy "Aerial Age" (U.S.A.).

Three views of the Italian "Macchi" flying boat in flight. Note the steep climbing angle in the right-hand view.

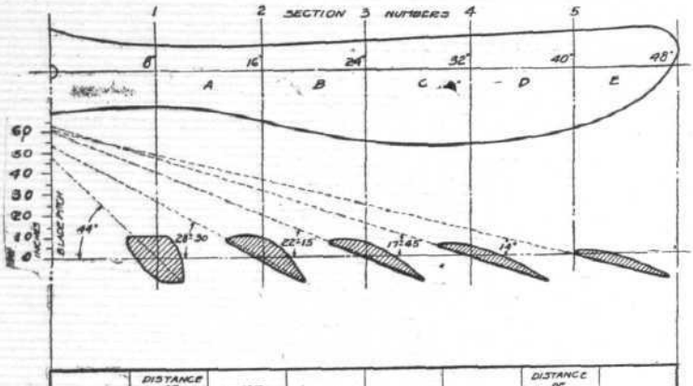
AIRSCREW ANALYSIS.

By A. F. ZAHM.*

Introduction.

Scope.—In a mathematical estimate of the merits of an airscrew it is customary to make, (1) an aerodynamic analysis; (2) a stress analysis; the first to determine the performance, the second the structural safety.

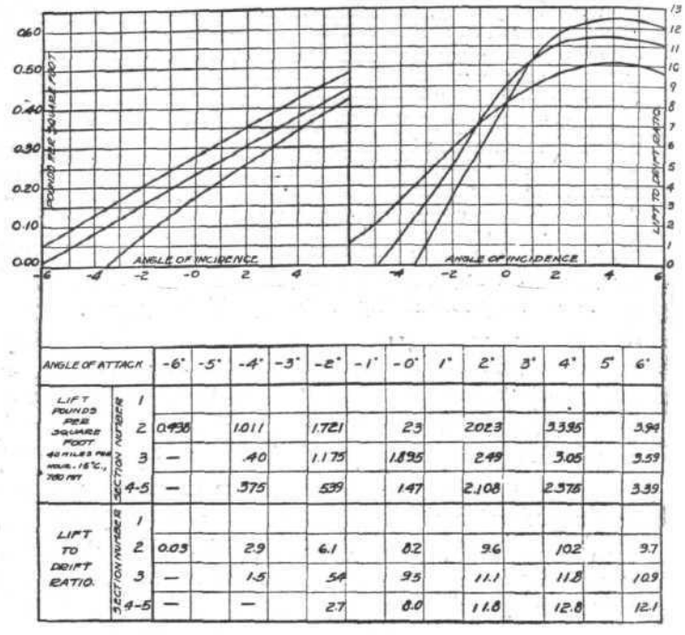
Basic Data for Airscrew Analysis.—Most airscrews consist of one or more blades secured to, or integral with, a central hub designed to be carried by a shaft rotating about an axis and moving along it. From hub to tip the blade varies in cross-sectional form, size and incidence. These three elements are usually planned to ensure the greatest efficiency consistent with structural safety and adequate thrust. Basic data for a typical airscrew are given in Figs. 1 and 2.



SECTION.	DISTANCE OF SECTION FROM PROPELLER AXIS IN FEET.	LENGTH OF SECTION CHORD IN FEET	SECTION AREA SQUARE INCHES	SECTION MODULUS INCHES	SEGMENT	DISTANCE OF CENTER OF GRAVITY OF SEGMENT FROM PROPELLER AXIS IN FEET.	MASS OF SEGMENT POUNDS.
1	0.667		0.89	.360	A	1.000	12.51
2	1.333	0.554	6.90	1.101	B	1.667	09.310
3	2.000	0.663	6.34	.745	C	2.337	08.199
4	2.667	0.701	5.32	.520	D	3.000	06.673
5	3.333	0.622	4.17	.385	E	3.667	04.974

REMARK.—SPECIFIC GRAVITY OF PROPELLER WOOD, .467; TENSILE STRENGTH 9000 POUNDS PER SQUARE INCH.

Fig. 1.



ANGLE OF ATTACK		-6°	-5°	-4°	-3°	-2°	-1°	-0°	1°	2°	3°	4°	5°	6°
LIFT POUNDS PER SQUARE FOOT 40 MILES PER HOUR, 15°C., 760 MM	1													
	2	0.936		1.011		1.721		23		2.023		3.395		3.94
	3	—		.40		1.175		1.895		2.49		3.05		3.59
	4-5	—		.375		539		147		2.108		2.376		3.39
LIFT TO DRIFT RATIO.	1													
	2	0.03		2.9		6.1		8.2		9.6		10.2		9.7
	3	—		1.5		5.4		9.5		11.1		11.8		10.9
	4-5	—		—		2.7		8.0		11.8		12.8		12.1

Fig. 2.

Aerodynamic Analysis.

Velocity and Air Force at Any Blade Section.—Each point of an airscrew blade describes a helical path whose pitch is constant when the speeds of rotation and translation bear a fixed ratio. The path is usually referred not to fixed space but to the general mass of approaching air, since this itself may be in translation. Fig. 3 shows how to find graphically the helix angle A, the incidence i, and resultant velocity $\overline{V}$, at any point of a blade whose peripheral and forward velocities, referred to the general air mass, are given.† Analytically A, i, and V are computed by the formulas:

$$\tan A = V/2\pi r N \quad (1)$$

$$V = (V^2 + 4\pi^2 r^2 N^2)^{1/2} \quad (2)$$

$$i = B - A$$

where V is the translational, N the rotational speed, r the radial distance of the moving point, and B the blade angle at r.

The unit air force at any section with speed V, may be found in magnitude very approximately by the formula

$$R = K\rho\overline{V}^2 \quad (3)$$

in which ρ is the density, K is the air force per unit surface at unit speed for an aerofoil having the form and incidence of said section and moving in air of unit density.‡ The direction of R in terms of the incidence is commonly known from aerofoil experiments. Otherwise the unit lift and drift are computed, and thence the resultant force. The unit lift is $L\rho\overline{V}^2$; the drift is $D\rho\overline{V}^2$; their ratio, $D/L = \tan^{-1} G$, gives the "gliding angle," or direction of R referred to the lift.§ If $\overline{V}$ be in miles per hour the lift and drift per square foot are $.0051L\overline{V}^2$, and $.0051D\overline{V}^2$, respectively.

Thrust and Torque, Thrust Power and Torque Power.—The forward component R_y of the air force in Fig. 3 is the unit thrust; the peripheral component R_x, multiplied by the section radius is the unit torque. Multiplying these units by the blade width gives the thrust and torque per unit length of blade, as tabulated and plotted in Fig. 4; and integrating obviously gives the whole thrust and whole torque for the blade. From these are derived the thrust power and torque power, on multiplying respectively by the forward and the rotational speed.‖

For use with a propeller computer, to be described presently, the unit thrust is written

$$R_y = .0051\overline{V}.L.V\sec G\cos(A+G) \quad (4)$$

when $.0051\overline{V}$ is called the "velocity factor"; $V\sec G\cos(A+G)$ the "thrust factor." Fig. 3 shows that this thrust factor times the lift on an element equals the unit thrust there.

* From *Aviation* (N.S.)

† It is here assumed that the air approaches the screw plane normally with uniform velocity V. A slight correction for this assumption must be made. No perfectly adequate formula is available for this correction. Riach proposes a theoretical formula assuming V normal to the screw plane and increasing in velocity.—*Journ. Aeron. Soc. Gr. Brit.*, March 21st, 1917.

‡ The effects of air viscosity and compressibility are here ignored. No material error thereby ensues. See J. C. Hunsaker, *Theory of Similitude of Aerial Propellers*; also Edgar Buckingham, *Physical Similarity*.

§ L and D are the absolute lift and drift coefficients, or the components of K taken respectively with and across the relative wind.

‖ The method of this paragraph is usually attributed to S. Drzewiecki; see his *Des Hélices Aériennes*, Paris, F. Louis Vivien, 1909.

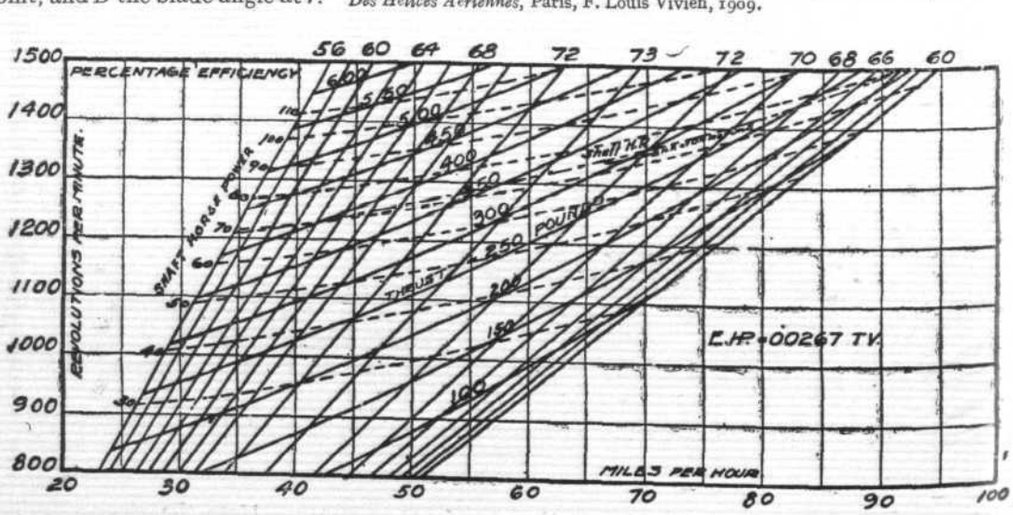
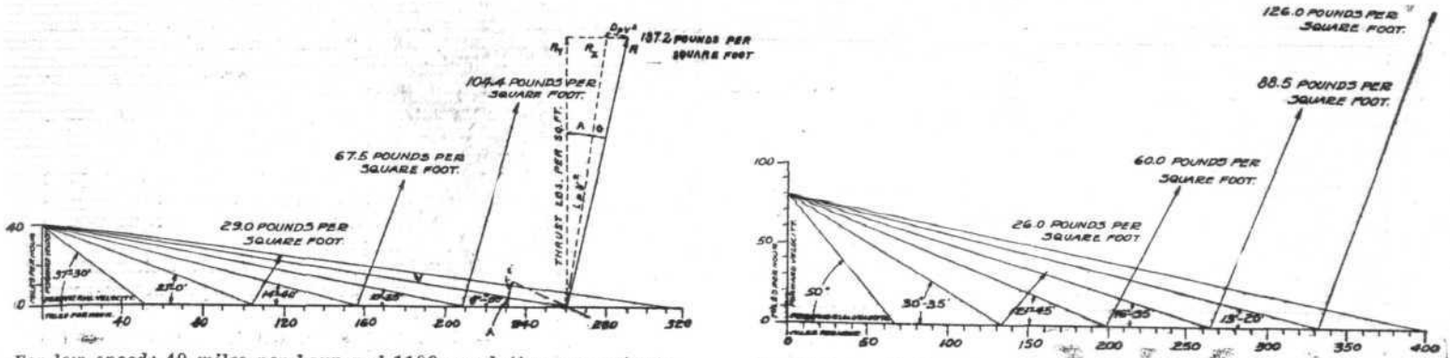


Fig. 6.

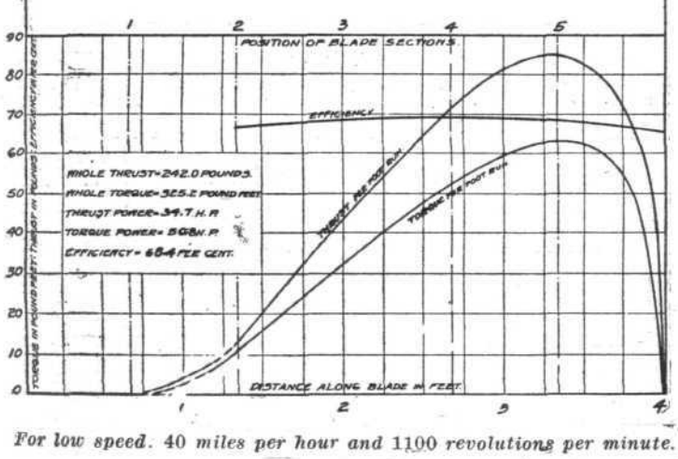
FLIGHT
AIRCRAFT ENGINEER



For low speed: 40 miles per hour and 1100 revolutions per minute. *For high speed: 80 miles per hour and 1400 revolutions per minute.*

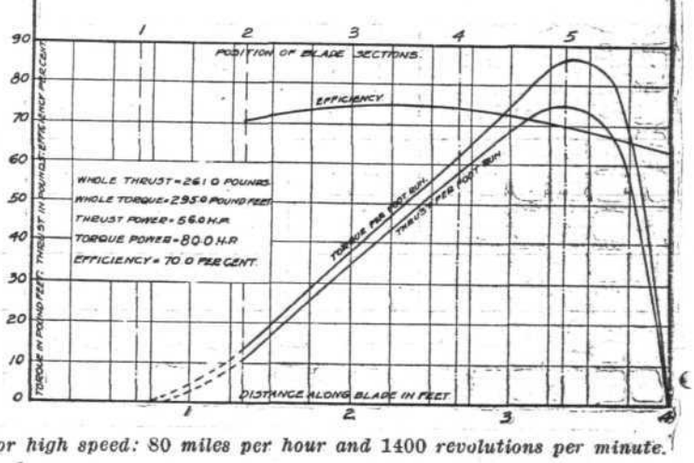
FIG. 3.—VELOCITY AT VARIOUS BLADE SECTIONS AND RESULTANT AIR FORCE PER SQUARE FOOT

BLADE SECTION NUMBER.	ANGLE OF ATTACK.	SPEED ALONG HELICAL PATH MILES PER HOUR.	LIFT IN POUNDS PER SQUARE FOOT.	DRIFT IN POUNDS PER SQUARE FOOT.	THRUST IN POUNDS PER FOOT RUN.	TORQUE IN POUND FEET PER FOOT RUN.	EFFICIENCY AT SECTION.
1	6°-30'	66					
2	7°-30'	112	27.9	3.98	13.50	10.32	66.5
3	7°-35'	162	66.3	6.38	43.50	30.30	68.3
4	6°-50'	213	104.1	8.91	70.50	52.10	68.8
5	5°-10'	264	136.9	10.99	84.60	63.00	68.4



For low speed. 40 miles per hour and 1100 revolutions per minute.

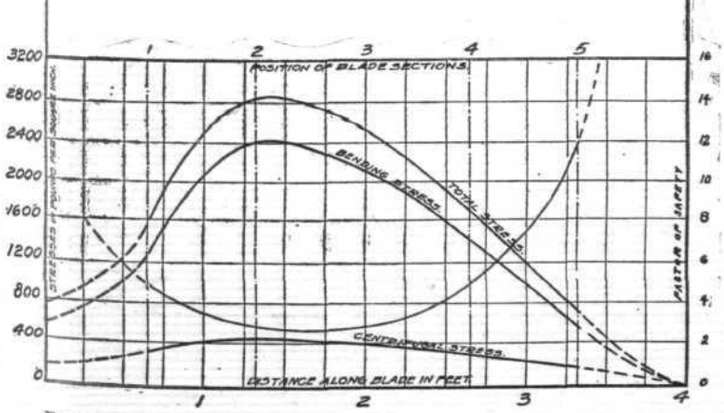
BLADE SECTION NUMBER.	ANGLE OF ATTACK.	SPEED ALONG HELICAL PATH MILES PER HR.	LIFT IN POUNDS PER SQUARE FOOT	DRIFT IN POUNDS PER SQUARE FOOT	THRUST IN POUNDS PER FOOT RUN.	TORQUE IN POUND FEET PER FOOT RUN.	EFFICIENCY AT SECTION.
1	-5°-40'	104				0.00	-00
2	-2°-5'	156	25.5	4.33	10.87	12.32	70.48
3	-0°-40'	215	58.97	5.78	35.3	37.75	74.80
4	1°-10'	277	88.2	8.48	57.6	62.00	74.32
5	0°-40'	342	125.3	12.92	75.5	86.20	70.00



For high speed: 80 miles per hour and 1400 revolutions per minute.

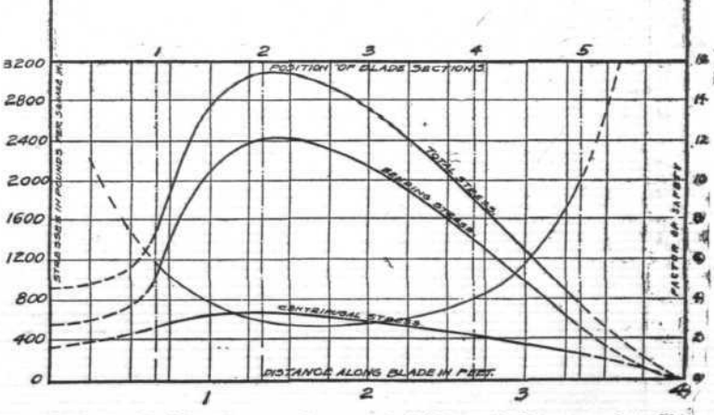
FIG. 4.—THRUST, TORQUE AND POWER EFFICIENCY

BLADE SECTION NUMBER.	BLADE SEGMENT	PERIPHERAL VELOCITY OF SEGMENT MILES PER HOUR.	CENTRIFUGAL FORCE OF SEGMENT POUNDS.	CENTRIFUGAL STRESS ON SECTION POUNDS PER SQUARE INCH.	AIR FORCE NORMAL TO FACE OF SEGMENT POUNDS.	BENDING MOMENT AT SECTION POUND INCHES.	BENDING STRESS ON SECTION POUNDS PER SQUARE INCH.	TOTAL STRESS ON SECTION POUNDS PER SQUARE INCH.	FACTORS OF SAFETY AT SECTIONS.
1	A	78.0	514.0	317.0	4.0	4556.0	1270.0	1587.0	5
2	B	131.0	640.0	425.0	11.2	3234.0	2420.0	2845.0	3
3	C	184.0	789.0	361.0	38.8	1980.0	2140.0	2501.0	3
4	D	337.0	825.0	282.0	53.2	924.0	1400.0	1682.0	5
5	E	288.0	676.0	162.0	59.3	237.0	532.0	694.0	12



For low speed: 40 miles per hour and 1100 revolutions per minute.

BLADE SECTION NUMBER.	BLADE SEGMENT	PERIPHERAL VELOCITY OF SEGMENT MILES PER HOUR.	CENTRIFUGAL FORCE OF SEGMENT POUNDS.	CENTRIFUGAL STRESS ON SECTION POUNDS PER SQUARE INCH.	AIR FORCE NORMAL TO FACE OF SEGMENT POUNDS.	BENDING MOMENT AT SECTION POUND INCHES.	BENDING STRESS ON SECTION POUNDS PER SQUARE INCH.	TOTAL STRESS ON SECTIONS POUNDS PER SQUARE INCH.	FACTOR OF SAFETY AT SECTION.
1	A	100.0	834.0	513.0	8.0	3480.0	975.0	1485.0	6
2	B	166.0	1036.0	687.0	17.4	2668.0	2420.0	3107.0	3
3	C	232.5	1277.0	584.0	33.4	1595.0	2140.0	2724.0	3
4	D	298.0	1336.0	436.0	47.0	727.0	1400.0	1836.0	4
5	E	367.0	1096.0	262.0	44.9	180.1	532.0	794.0	10



For high speed: 80 miles per hour and 1400 revolutions per minute.

FIG. 5.—STRESSES AND FACTOR OF SAFETY

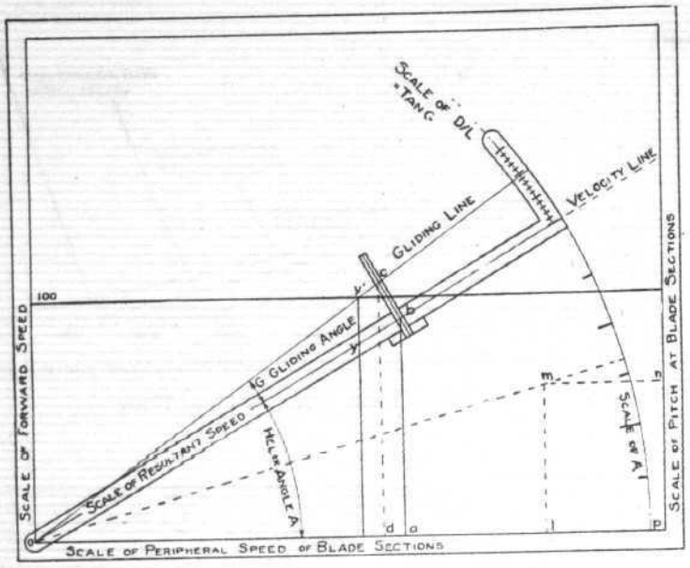


Fig. 7.

Since $oa = 2\pi rN$, $ab = v$, $\therefore ob = V = (4\pi^2r^2N^2 \times v^2)^{\frac{1}{2}}$, called "path velocity."

Since section efficiency $e = \tan A/\tan A \times G = y/y'$, $\therefore e = y$, if y' be chosen = 100.

Since $od = oc \times \cos(A+G)$, and $oc = V \sec G$, $\therefore od = V \sec G \cos(A+G)$, called "thrust factor."

If ol = radius of any blade section whole blade angle = mol, then $pn = 2\pi ml$ = pitch at section.

Path velocity ob, section efficiency y, thrust factor od, pitch pn, all read directly; also helix angle A.

Efficiency.—The efficiency of a propeller, or any part thereof, is the ratio of the useful to the total work in propulsion; or the ratio of the thrust power to the torque power either for the whole or for the part in question.

By a well known formula the efficiency of an elementary segment of the blade contained between two cylinders coaxial with the screw is

$$\epsilon = \tan A/\tan(A+G) \qquad (5)$$

For proof, Fig. 3 shows that $V_y/V_x = \tan A$; $R_y/R_x = 1/\tan(A+G)$. Their product is the efficiency. These statements are true of all blades whatever the form of flow past them, provided $\tan G$, = drift/lift, represent the actual flow. A curve of section efficiency ϵ, derived from this formula is plotted in Fig. 4, together with the corresponding thrust t, and torque q, per foot run.

In practice the curve of running torque q is derived from the other two by the formula

$$q = ct/\epsilon \qquad (6)$$

where c is the ratio V/ω of the speeds of translation and rotation (in radians per second). From these efficiency and torque curves the efficiency for the entire blade may be found by piecemeal integration.¶ But the aggregate effi-

¶ If q, ϵ, be the running torque and efficiency at the radial distance r along the blade, the efficiency for the whole blade is $E = \Sigma q\epsilon dr/\Sigma q dr$.

a		b					c	d		
Section Radius Feet	Chord Length Feet	Blade Angle	Blade Incidence	Blade Curve Number	Lift Coeff.	Drift / Lift	Section Efficiency	Velocity Factor .0051V	Thrust Factor	Thrust per Foot Run
Given	Given	Given	Found by Subtraction	Given	Given	Given	Read on Instrument	Read on Instrument	Read on Instrument	Product of a, b, c, d.

Fig. 8.

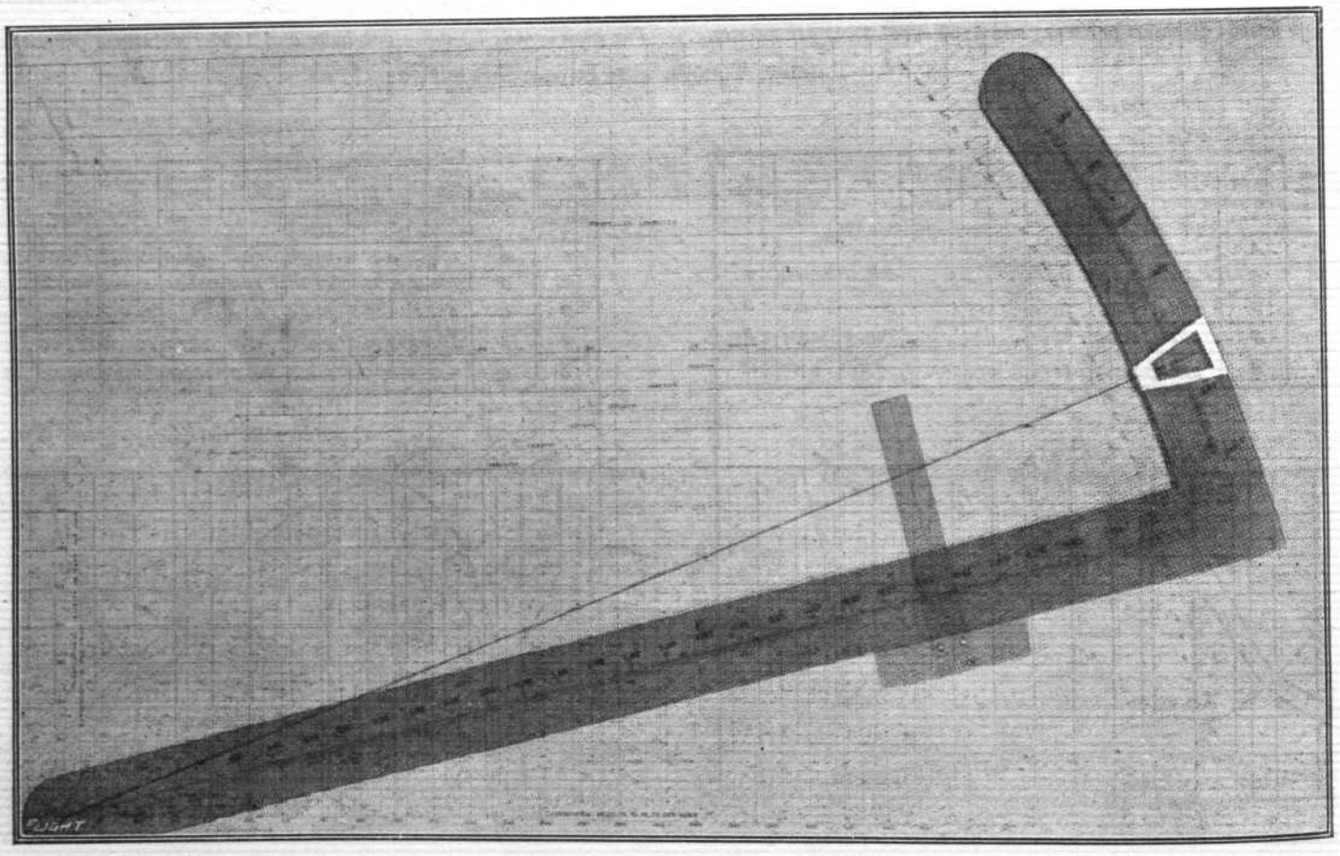


Fig. 9.

ciency is more simply found as the ratio of the whole thrust power to the whole torque power, once these have been computed.

Map of propeller characteristics.—When a propeller becomes of permanent interest, a map giving two of its chief characteristics, *e.g.*, its aggregate thrust and efficiency, is made, as in Fig. 6, from which the other three, *i.e.*, the thrust-power, torque and torque power, are readily derived. The map not only tells at a glance the capabilities of the given propeller, but also, through well-known laws of comparison, to be given presently, serves to compute quickly the output of others similar to it. The making of this map, which involves several repetitions of the computations already explained for a succession of speeds, is laborious by the usual method, as here indicated, but easy and brief by the use of a suitable instrument.

Propeller computer.—Fig. 7 shows a kind of slide rule by which the thrust, efficiency, &c.—also various incidental properties of a propeller blade—can be quickly derived. A transparent sliding radial arm, having a central "velocity line" graduated to a linear velocity scale, is pivoted at one corner of a cross-section sheet whose ordinates and abscissæ are respectively the forward and peripheral speeds of the blade at various radial distances.

If the radial slide is set with its velocity line passing through the "velocity point" b, on the paper, *i.e.*, a point whose co-ordinates are the component speeds of any blade section, then ob on this line represents that section's helical velocity $\overline{V}$, while its inclination to the X-axis is the helix angle A for the path of each point of that section, and is read in degrees on the graduated arc at the margin of the paper. This angle taken from the known blade angle for the section gives the incidence.

The centre line of the radial arm is also graduated to read $.0051\overline{V}$, called the "velocity factor" in equation (4), and used to find the thrust when $\overline{V}$ is in miles per hour.

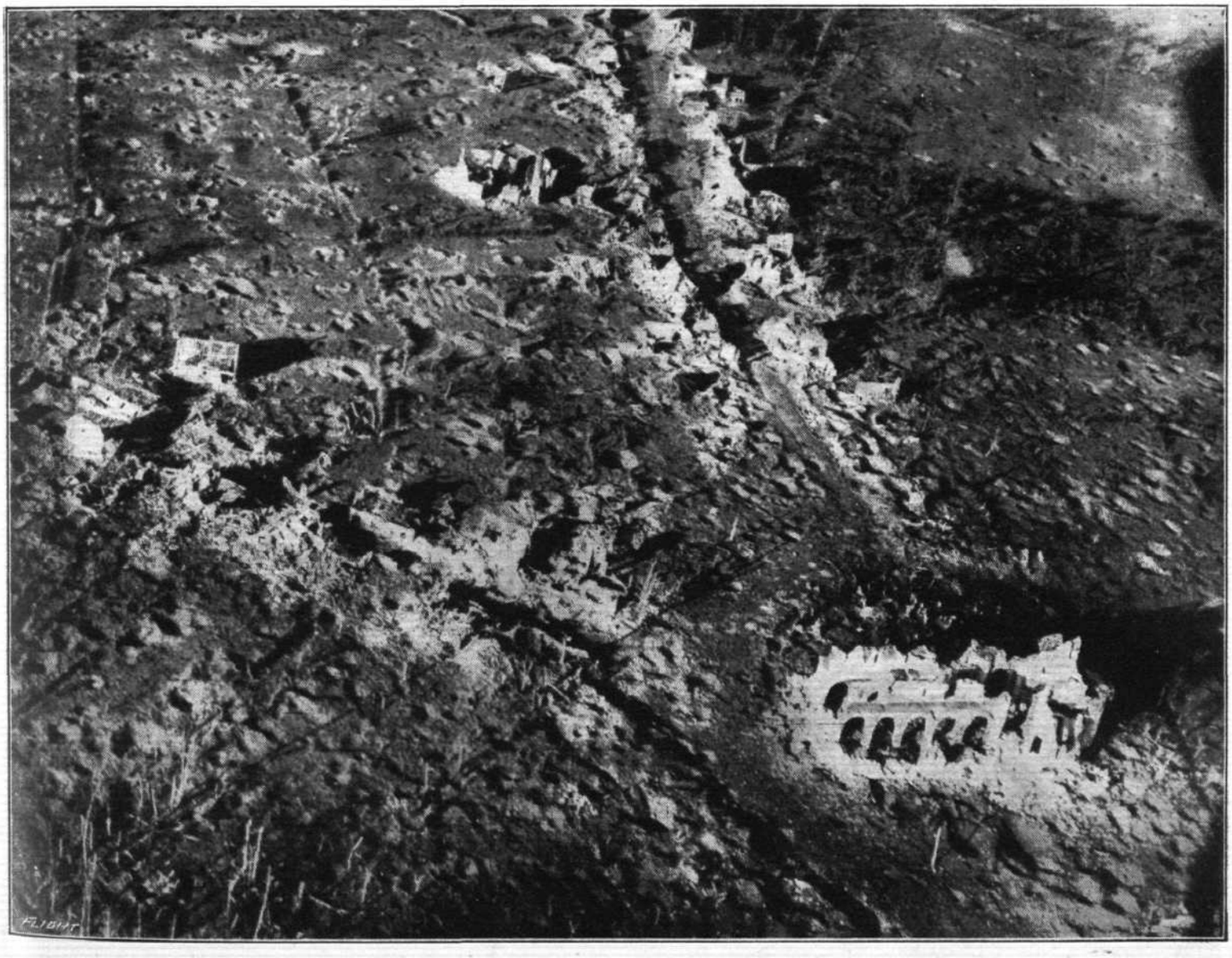
Now, setting the shown "gliding line," or thread, upon the tan$G$ scale at the number expressing the drift/lift ratio for this incidence, its inclination to the X-axis is the angle $A + G$. Then is read at once the section efficiency ϵ, as the ratio $\tan A/\tan(A + G)$, or the ratio y/y^1 of any two coincident ordinates y, y^1, reaching up respectively to the velocity line and the thread or gliding line. If y^1 be chosen as 100, y is the exact percentage efficiency.

Next the black centre line of a transparent T-square is laid over the velocity point b, and squarely across the radial arm, and across the gliding line at the "thrust point" c, whose abscissa is the "thrust factor" $V\sec G\cos(A + G)$.

All the numerical values thus far read from the instrument, together with some given properties and dimensions of the blade sections, are entered in a row, as in Fig. 8. Under them are inserted like readings for other blade sections. Columns a, b, c and d are now multiplied together giving the last column. The entire work of taking and entering the readings occupies less than 10 minutes.

A practical form of the instrument, as exhibited in Fig. 9, comprises: (1) a sheet of ordinary section paper on a drawing board; (2) a transparent celluloid ruler with one end pivoted at the origin, the other curved to a circular arc; (3) a small celluloid T-square to slide along the straight length of the ruler. Riding on the ruler is a fine thread reaching from the pivot to an aluminium slide which plays freely along the arc. A fuller treatment of the theory and operation of this instrument is given by W. P. Loo in the *Journal of the Franklin Institute* for December, 1917.

(*To be concluded.*)



PASCHENDALE FROM THE AIR.—Photograph of the town of Paschendale, taken by a German airman at a height of 2,000 feet.

AIRISMS FROM THE FOUR WINDS

VERY refreshing were the more than candid views expressed the other day by Sir Arthur Lee to his constituents at Fareham, upon that subject—"putrid politics"—which from time to time has been in these pages animadverted upon. Fortunately Sir Arthur can afford to take his chances of being "out of a job" if the local electors think him wrong. In fact, if continuing in political life meant going back to the "old dreary, trivial caucus-contrived and whip-driven squabbles which had wasted the time of Parliament for more years than I care to remember," then as far as he was concerned there would be nothing doing. That was his unalterable determination, he continued, and if his constituents did not like it they must look out for another member. The old political parties with the old catch-vote programme were, in his judgment, as "dead as mutton," and that applied equally to Tory, Radical and Labour. There would be a new world after the war, and quite different politics and parties, and the lines of division between the opinions of men and women would be in quite different places from those hitherto known. He advocated after the war the smallest professional Army which was compatible with national safety, but universal military service on the most democratic basis, with no exemptions of any kind except physical unfitness.

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"PUTRID politics" have in the past sufficiently jeopardised our supremacy in the air for all time. Let that new party get going, and under whatsoever name it may elect to enter the arena, so long as it makes it difficult, if not practically impossible, for the professional political puppets to have a majority vote upon National affairs, there are few in Blighty whose support it will fail to get. Let Sir Arthur Lee push his campaign sufficiently well, and he should be assured of the support of all honest men.

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MAJOR W. A. BISHOP, V.C.'s war experiences, especially in the air, should be a fascinating theme, and the publication of these in book form, foreshadowed by the *Canadian Daily Record*, is welcome news. Evidently Major Bishop is a man of no mean judgment. "The name for the book is the sticking part," says he, "It's harder than writing the book itself."

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"AN All-Russian Aviation Congress" has been called by invitation on February 10th in Petrograd, through the Russian Wireless Stations, comprising the aviation detachments and groups on the Northern, Western, Southern, South-Western and Roumanian fronts.

One of the recent governments in power in Russia has, we seem to remember, put its programme forward as aiming at bringing the rest of the entire world to *its* way of thinking, as to which particular class is to boss things in the near future, and subject to disagreement with this quaint democratic idea, then it's to be war against the lot. Perhaps, therefore, this "Congress" may be the forerunner of putting into operation the plans of this particular Russian government, and in that case, there really may be a certain amount of saneness somewhere behind these reformers, assuming that the calling together of the air forces is the preliminary to the start of reformation. It's that way the next war is likely to trend.

THAT the assembly is serious may be gathered from the intimation attached to the R.S.V.P. that delegates must bring their own tea, sugar and bread, "in order to avoid possible inconvenience."

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ON the eve of short commons at home, it is not uninteresting to have at first hand experience what being the enforced guest of the Hun means to our boys who have had for various reasons to accept the enemy's hospitality. In this direction a little light is let in by Flight Sub-Lieut. Macdonald, son of a Buckinghamshire tribunal's military representative, who experienced hard luck in having to descend on the wrong side of the German lines. Speaking of the prisoners' camp, Lieut. Macdonald says: "The food is not luxurious, but it is sufficient. At eight a.m., we have German black coffee and a slice of bread and jam: at noon, a large bowl of soup and a slice of bread: at six p.m., another bowl of soup, more coffee, and another slice of bread, with jam or butter. This does not sound much, and we would give anything for a good square English meal, but under the circumstances it is not so bad. After our last meal we go to bed, and sleep the clock round!"

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As Lieut. Macdonald dates his communication from Limburg, possibly the very meagre fare detailed above is the result of another form of "frightfulness" on the part of the German commissariat, which relies upon the feeding qualities of the aroma of the local "stinkkase" to make up for shortcomings in the Spartan diet supplied.

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LIEUT. MACDONALD has since had a bit of luck, apparently, in being removed to Karlsruhe camp, probably as a hostage against attack by the Allies from above, as in this camp his experience is as follows: "We are waited on by a French private (prisoner, of course), who is a genius at cooking. To-day he made us a delightful pudding out of three apples and some broken stale biscuits. He can also make the most appetising puddings out of bully beef and potatoes. You ought to come here and take some lessons in domestic economy." Why not kill time in the camp by compiling a war-time cookery book in collaboration with the French Johnnie, although the German authorities would hardly allow such valuable aid to "starving England" to pass from its shores at the present stage of the world's breaking test.

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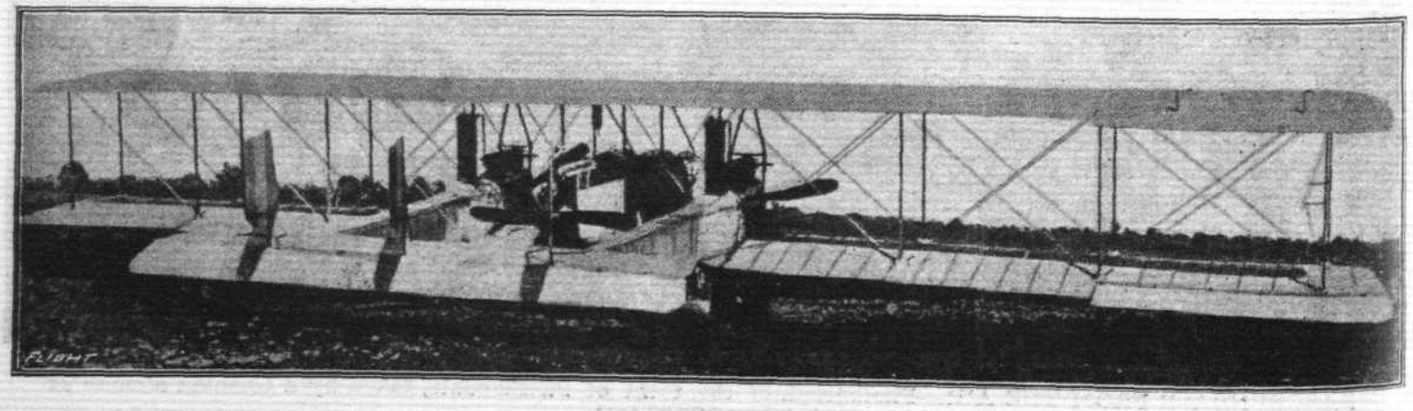
THE details of how Lieut. Macdonald came to be in Hunland have an interest quite their own. His own recital of his mishap is: "I was in the first raid we did from the new place. One of the bombs failed to drop, and as we had no gun-layer at the back, my observer climbed to release it. On his way back, however, he unfortunately put his foot into the propeller, breaking it and his foot. There was a strong wind against us, and I couldn't get back with one engine. We had to land, which operation I managed to effect on the top of a pine wood, completely wrecking the machine, but not hurting ourselves in the least. We soon discovered that we were in Germany, so gave ourselves up and made the best of a bad job."



From "Aerial Age" (U.S.A.).

One of the "smaller" Caproni bombing biplanes, fitted with three motors of 200 h.p. each.

"BRITISH aviators dropped bombs on the town of Demir-Hissar in the vicinity of the military hospital, which was well in view. Three inhabitants were wounded. No material damage was done."—Bulgarian *communiqué* of January 18th, received January 21st. Possibly this version is quite correct, and is a good example of the "suggestion frightful." Our pilots would take no chances of hitting the hospital, even if they knew they would be likely to miss their other military objectives, which the Central Powers, in their kultured cunning, have such a happy knack of placing in juxta-position to Red Cross and other centres of mercy.

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LAST week attention was drawn to a report in a Midland paper of an aviator's "adventurous home-coming," which purported to set forth the antics of an over-confident youthful aviator. It was apparently a case of "stunting" against which we have in these pages so consistently set our face, and we once more pointed the moral, although, with caution, we qualified it as being described in "local scribe's journaleese.' And in this latter deduction we are very glad to say we do not appear to have been very far wrong. In the extract we gave last week is to be found the "journaleese" picture. The following is the real story which now reaches us, and which places a totally different complextion upon the little episode, but which would, of course, hardly have appealed to the readers of our Midland contemporary, unaccompanied by the imaginative frillings which embellished the original, exciting as the pilot's adventure actually was. It appears that there was no "stunting" of any sort; rather the reverse. The pilot, it appears was away up yonder and got mixed up with a raging snowstorm which broke out in the neighbourhood of the aerodrome from which the aviator had ascended. In the words of our correspondent what then happened is as follows:—

"He came down to 500 ft., but could not see the ground, although he was seen by the instructor, who was on the look-out for him, to make the attempt half an hour after going up.

"He, therefore, rose again to 5,000 ft. and steered N.W. to keep the machine over the level country of the district, until he came out of the storm. Once he came down, but rose again after reaching the 500 ft. level still without being able to see a thing. For an hour and twenty minutes he steered by compass only, and came out of the snowstorm over a distant point. It appears that here the only place he knew at which he could procure petrol on a Sunday was some large aviation works a couple of miles off from his native place. He made for this factory, and first of all landed at ——, again in a snowstorm, and inquired where he was and the direction to the works. After waiting some time for it to clear, he took off again in the direction pointed out, and this time landed (*again in a snowstorm*) at ——. Here he took on board ten gallons of petrol and started again in a southerly direction for his aerodrome.

"After flying round to test his engine before returning he set off south. Over a certain Midland cemetery his pressure failed, and he circled the city pumping the whole way, back again to the aviation works, and when on the way the hand pump failed and he made the first field he could.

"The smash was not due to a faulty landing on the pilot's part, but to people running across his course."

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WE are inclined to agree with the implied suggestion that the reporter was indeed an "addle-pated" journaleese profiteer.

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THAT reticence upon the part of our own military authorities upon the deeds of individual members of the Forces is, whether wisely or otherwise, carried to the extreme, few can, under the conditions of this long drawn-out war, gainsay, and there are many who, in spite of musty precedents of peace times, would not be averse to seeing a little more generous latitude in this connection. There is a happy medium, however, between a dignified recital of deeds of heroism and "gush" of the character which is indulged in by the official Huns to energise their flying services *and*, incidentally, the long-suffering public, if one may accept as a fair sample the broadcast exploitation of the deeds of daring of Chief Mechanic Heinrich Fey, in charge of the starboard motor of a Zeppelin,

CAMBRAI FROM THE AIR.—The town of Cambrai photographed from a German aeroplane at a height of 2,000 feet.

who has been awarded the Iron Cross of the first class for repairs carried out under fire while over England.

"Chief Mechanic Heinrich Fey, of Rastorf, County of Lauenburg," so the official version runs, "took part in a cruise to England on the night of November 27th-28th, 1916. During the trip the cooler apparatus of his motor got out of order, and in the inky darkness Fey was unable to put it right. He tugged and tugged at it, but not being able to see properly was baffled. When the Zeppelin about 10 p.m., reached the English coast south of Flamborough Head it was 'picked up' by English searchlights and held in an ellipse of light amid the heaviest gunfire. The ship, after dropping bombs, tried to escape by zig-zagging, and while doing so came under the strong fire of motor-car guns and, later, of defensive batteries on the Humber. Suddenly, to their astonishment, the crew discovered Fey in the midst of the bombardment, taking advantage of the illumination by clambering outside his gondola and calmly working on his cooler-curtain. He remarked to a mate as he climbed out, 'This is a fine opportunity to bring this *verfluchtes* (damned) thing into shape, and, suiting his action to the words, the chief mechanic accomplished his object as unperturbed up there in the tremendous altitudes as if he were in a hangar at home—thanks to the help given him by English searchlights.

"Fey won the Iron Cross of the second class some time ago. Now the premier Iron Cross bedecks the bosom of this daring unterrified air sailor."

TEN YEARS AGO.

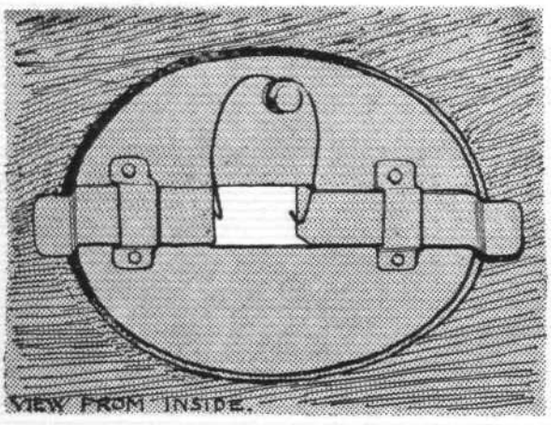
Excerpts from the "Auto." ("FLIGHT'S" precursor and sister journal) of January, 1908. "FLIGHT" was founded at the latter end of 1908.

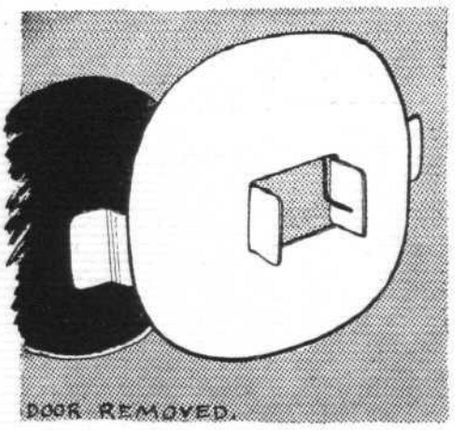
HENRY FARMAN'S RECORD FLIGHT.

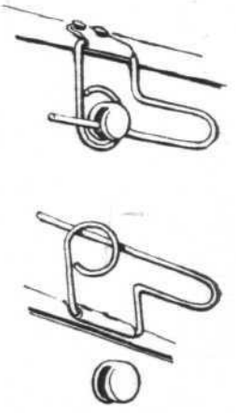
An immense stride has been made in aeronautics by the winning of the Deutsch-Archdeacon Prize, which was accomplished by Mr. Henry Farman on Monday of this week, January 13th. The Grand Prix d'Aviation of 50,000 francs offered by M. Deutsch de la Meurthe and M. Ernest Archdeacon to the Aero Club de France, to be awarded to the inventor of a flying machine who shall first accomplish a flight of one kilometre in a closed circuit without touching ground, has been officially won to-day, Monday, January 13th, 1908, at Issy-les-Moulineaux, by Mr. Henry Farman, in his first and single flight made at 10.15 this morning. The duration of the flight, according to the time officially taken by M. H. Kapferer, was 1.28s., and the average elevation was between four and six metres from the ground. The Committee of Aviation met on the same day, at 4.30 in the afternoon, to enter an official record of the result in the books of the Aero Club.

CONSTRUCTIONAL IDEAS.

ON the Ago biplane described in "FLIGHT" recently use was made of a simple little inspection door which is easily detachable. It is made of aluminium, and the door itself is slightly larger than the hole in the three-ply *fuselage* covering.







In the centre of the door is a small slot through which projects the ends of two sliding strips of aluminium that secures the the door in place. The outer ends of these strips are bent as shown in the sketches, to enclose between them and the edges of the door, the three-ply covering. A small steel wire spring prevents the strips from sliding inwards during flight.

To remove door the strips are pressed together until they clear the edges of the opening in the body. On the right is shown another neat little Ago "dodge." This is a quick release catch securing the turtle back of the *fuselage* to the upper *longerons*. Its action will be evident from the sketches. By undoing a few of these catches the whole turtle back can be lifted off and the *fuselage* bracing got at.

The Fight with the "Goeben."

IN the Admiralty announcement detailing the action with the "Goeben" and "Breslau" at the entrance to the Dardanelles on January 20th, in which the latter vessel was blown up and the former beached after being mined, there are several references to the work of aircraft in the subsequent stages of the fight.

"The 'Goeben' continued on her southerly course until an attack by our aircraft forced her to alter course and head for the Dardanelles. In the act of turning, however, she struck a mine, which caused her to settle down aft with a list of 10 to 15 degrees, and which considerably reduced her speed. She proceeded slowly up the Dardanelles escorted by enemy seaplanes and the four Turkish destroyers which had returned to her assistance. Our aircraft repeatedly attacked her, and obtained two direct hits when off Chanak.

"'Goeben' was now in such a damaged condition that she was steered for the shore and was beached at the extreme end of Nagara Point, about 100 yards from the lighthouse. Shortly after beaching, two more direct hits were made on her by our aircraft, who were heavily engaged by several enemy seaplanes. In the encounters which took place one of our seaplanes failed to return.

"The shore batteries at Cape Helles then opened an accurate fire on 'Tigress' and 'Lizard.' who had been following 'Goeben' and, in view of the activity of our naval aircraft, the two destroyers retired out of range and proceeded to rescue the survivors of 'Breslau.'

"Our aircraft reported on Monday afternoon that 'Goeben' was still ashore in the same position. She is still being bombed.

The Turkish *communiqué* says: "Lively aerial activity reigned on both sides. An enemy aeroplane was shot down in an aerial fight and a second seriously damaged."

Two more Aeroplanes from Malaya.

THE efforts of Mr. C. Alma Baker have resulted in an additional sum of £4,500 being collected in the Malay Peninsula for the purchase of two more aeroplanes for the use of the Royal Flying Corps. They will be named "Malaya 33, Alma Baker No. 4," and "Malaya 34, The Ashworth Hope, No. 2."

Back from Germany.

IN addition to the flying officers mentioned in our last issue, the party of prisoners which has returned from Germany to England included :—

6211 Pte. T. W. Hughes, R.F.C.
77921 2nd Air-Mech. S. Thompson, R.F.C.

American Honour for Nungesser.

THE committee of the Aero Club of America has conferred its gold medal on Lieut. Nungesser, the famous French airman.

An Air Fight Over Holland.

A CIRCUMSTANTIAL story is printed by the *Maasbode* regarding an aerial engagement said to have been fought over Aardenburg (Province of Zeeland) between three aeroplanes and a balloon. The latter finally fell to the ground in flames. The nationality of the combatants is not known.

FLIGHT
AIRCRAFT ENGINEER

INTERNATIONAL AIRCRAFT STANDARDS.

(*Continued from page 77.*)

3S25—*Specifications for Extra Soft Carbon Steel Sheet.*

GENERAL.—1. The general specifications, 1G1, shall form, according to their applicability a part of these specifications.

MATERIAL.—2. The material for these sheets shall be chosen from the I.A.S.B. standard steels listed below. The composition shall be stated by the manufacturer or contractor, and is further limited as follows: Carbon, not over 0.15 per cent.

MANUFACTURE.—3. (*a*) The steel shall be manufactured, or at least finished, by the open-hearth, electric-furnace or crucible process.

(*b*) A sufficient discard shall be made from each ingot to secure freedom from piping and undue segregation.

(*c*) Sheets, unless ordered cold rolled, shall be full pickled.

Heat Treatment.—(*d*) Sheets are to be well and uniformly annealed in accordance with goodc ommercial practice. For sheets lighter than 0.065 in. (1.65 mm.), box annealing is preferred. For sheets 0.065 in. (1.65 mm.) and thicker, open annealing is preferred.

WORKMANSHIP AND FINISH.—4. (*a*) The sheets must be commercially flat, clean, smooth, free from seams, laminations, blisters, and other surface defects. They must be uniform in quality, and within the stipulated margins of manufacture.

(*b*) Any sheet may be rejected because of injurious defects or faults in manufacture at any time, notwithstanding that it has previously been accepted by the inspector; it shall be returned to the manufacturer at the latter's expense. This clause shall not be taken to apply to materials fabricated after export.

PHYSICAL PROPERTIES AND TESTS.—5. (*a*) Specimens cut in any direction from the sheets shall have the following properties:

Tensile Test.—(*b*) Minimum tensile strength, 50,000 lb. per sq. in. (35.2) kg./mm.^{2}); minimum yield point, 30,000 lb. per sq, in. (21.09 kg./mm.^{2}; minimum elongation 25 per cent. in 4 ins. (101.6 mm.).

Bend Test.—(*c*) Strips cut from sheets shall stand being bent cold through an angle of 180 deg. in any direction to a radius equal to the thickness of the sheet without fracture.

(*d*) Strips 1¼ in. (31.75 mm.) wide cut from sheets and with edges rounded shall stand reverse bending, cold, through an angle of 90 deg. for not less than three complete reversals, without fracture. The test is to be made in a square-nose vice, the edges over which the specimen is bent being rounded to a radius equal to three times the thickness of the sheet.

SELECTION OF TEST SPECIMENS.—6. Three sheets shall be taken from each annealing box to represent the top, middle, and bottom of the stack, or 1 sheet from each 25 when sheets are open annealed. One tensile, one bend, and one reverse bending test shall be made from each sheet selected.

DIMENSIONS AND TOLERANCES.—7. The dimensions and tolerances shall be those given in the table below and in the specifications 3S11. The thickness will be specified in decimals of an inch or millimetres.

DELIVERY, PACKING, AND SHIPPING.—8. (*a*) Sheets shall be cut to the required dimensions and shall be ordered in as narrow widths as can be used.

(*b*) All sheets shall be oiled for protection against corrosion.

(*c*) Sheets 0.065 in. (1.65 mm.) or thinner shall be boxed, the weight of box with contents not to exceed 220 lb. (100 kg.).

(*d*) Sheets thicker than 0.065 in. (1.65 mm.) up to and including 0.125 in. (3.18 mm.), shall be crated, the weight of crate and contents not to exceed 220 lb. (100 kg.).

(*e*) Sheets thicker than 0.125 in. (3.18 mm.) may be bundled, the weight of bundle not to exceed 220 lb. (100 kg.).

TABLE OF TOLERANCES FOR STANDARD STEEL SHEETS.

Thickness.		Tolerance for sheets 14 ins. (35.6 cm.) wide and under.		Tolerance for sheets over 14 ins. (35.6 cm.) wide.	
Ins.	Mm.	Ins.	Mm.	Ins.	Mm.
0–0.020	0.51	+0.001 −0.002	+0.03 −0.05	±0.002	±0.05
0.021–0.030	0.54–0.76	+0.002 −0.003	+0.05 −0.08	±0.003	±0.08
0.031–0.040	0.79–1.02	±0.003	±0.08	±0.003	±0.08
0.041–0.050	1.05–1.27	±0.003	−0.08	±0.004	±0.10
0.051–0.065	1.30–1.65	±0.004	±0.10	±0.004	±0.10
0.066–0.080	1.68–2.03	±0.004	±0.10	±0.005	±0.13
0.081–0.100	2.06–2.54	±0.006	±0.15	±0.006	±0.15
0.101–0.120	2.57–3.05	±0.006	±0.15	±0.007	±0.18
0.121–0.250	3.08–6.35	±0.006	±0.15	±0.008	±0.20

COMPOSITION OF STANDARD STEELS.

Number.	Carbon.	Manganese.	Phosphorus, maximum.	Sulphur, maximum.
1010	0.05–0.15	0.30–0.60	0.045	0.050

When electric or crucible steel is specified in the order, the maximum allowable percentage of phosphorus and sulphur may, at the option of the purchaser, be limited to 0.03 per cent.

3N11—*Specifications for Aluminium Alloy Castings.*

GENERAL.—1. The general specifications, 1G1, shall form, according to their applicability, a part of these specifications.

USE.—2. Two alloys are described.

Alloy 1 is suitable for crank cases and general purposes for which tensile strength is required.

Alloy 2 is suitable for die castings for bearing surfaces and pistons for use at higher temperatures.

MATERIAL.—3. (*a*) These alloys shall have the following compositions:—

	Alloy No. 1.	Alloy No. 2.
Specific gravity	2.89	2.95.
Copper	7.0 to 8.5 per cent.	9.25 to 10.75 per cent.
Impurities	Not over 1.7 per cent.	Not over 1.7 per cent.
Aluminium	Balance	Balance.

(*b*) Ingot aluminium of grades Standard No. 1 and Standard No. 2 may be used in making these alloys.

WORKMANSHIP AND FINISH.—4. (*a*) The castings are to be clean, sound, and free from blowholes, misruns, cracks, shrinks, and similar defects.

(*b*) No repairing, plugging, or welding will be allowed unless previous permission in writing has been obtained from the inspector; such permission will only be given when the defects to be repaired are small and do not affect the strength of the casting.

PHYSICAL PROPERTIES AND TESTS.—5. (*a*) The alloys shall have the following minimum physical properties:—

Tensile Test.—

	Alloy No. 1, sand cast.	Alloy No. 2, sand or die cast.
Tensile strength	18,000 lbs. per sq, in. (12.65 kg./mm^2).	18,000 lbs. per sq. in. (12.65 kg./mm.^{2}).
Elongation in 2 ins. (50.8 mm)	1.5 per cent.	—

(*b*) These alloys when poured hot into very thin difficult sections, such as crankcase pans, carburettors, and manifolds, shall not be required to show a greater tensile strength than 14,000 lb. per sq. in. (9.84 kg/mm.^{2}).

SELECTION OF TEST SPECIMENS.—6. (*a*) At least one sample is to be cast to represent each crank case or other large casting; this is to be attached to the casting; no chills may be applied to the test specimen.

(*b*) The number of test samples for smaller castings is left to the discretion of the inspector, who is to satisfy himself that the quality of the metal used is satisfactory and uniform.

(*c*) The latter samples are to be case separate, but also in sand and without the use of chills.

DIMENSIONS AND TOLERANCES.—7. (*a*) The castings are to be accurately in accordance with the drawings, and sufficient allowance is to be made to enable them to be machined where required to the finished dimensions without leaving evidence of the cast surface.

(*b*) A tolerance of 3 per cent. is allowed in the weight of the individual castings.

3S27—*Specifications for One-Half Hard Carbon Steel Sheet.*

GENERAL.—1. The general specifications, 1G1, shall form, according to their applicability, a part of these specifications.

MATERIAL.—2. The material for these sheets shall be chosen from the I.A.S.B. standard steels listed below. The composition shall be stated by the manufacturer or contractor, and is further limited as follows: Carbon, not over 0.40 per cent.; manganese may be from 0.30 to 0.60 per cent.

MANUFACTURE.—3. (*a*) The steel shall be manufactured, or at least finished, by the open-hearth, electric-furnance, or crucible process.

(*b*) A sufficient discard shall be made from each ingot to secure freedom from piping and undue segregation.

(*c*) Sheets, unless ordered cold rolled, shall be full pickled.

Heat Treatment.—(*d*) Sheets are to be well and uniformly annealed, in accordance with good commercial practice. For sheets lighter than 0.065 in. (1.65 mm.), box annealing is preferred. For sheets 0.065 in. (1.65 mm.) and thicker, open annealing is preferred.

WORKMANSHIP AND FINISH.—4. (*a*) The sheets must be commercialy flat, clean, smooth, free from sems, laminations, blisters, and other surface defects. They must be uniform in quality, and within the stipulated margins of manufacture.

(*b*) Any sheet may be rejected because of injurious defects or faults in manufacture at any time, notwithstanding that it has previously been accepted by the inspector; it shall be returned to the manufacturer at the latter's expense. This clause shall not be taken to apply to materials fabricated after export.

PHYSICAL PROPERTIES AND TESTS.—5. (*a*) Specimens cut

in any direction from the sheets shall have the following properties :—

Tensile Test.—(*b*) Minimum tensile strength, 75,000 lb. per sq, in (52.73 kg./mm.²) ; minimum yield point, 45,000 lb. per sq, in. (31.64 kg./mm.²) ; minimum elongation, 18 per cent. in 4 ins. (101.6 mm.).

Bend Test.—(*c*) Strips cut from sheets shall stand being bent cold through an angle of 180 deg. in any direction to a radius equal to the thickness of the sheet without fracture.

(*d*) Strips 1¼ in. (31.75 mm.) wide cut from sheets and with edges rounded shall stand reverse bending, cold, through an angle of 90 deg. for not less than three complete reversals, without fracture. The test is to be made in a square-nose vice, the edges over which the specimen is bent being rounded to a radius equal to three times the thickness of the sheet.

SELECTION OF TEST SPECIMENS.—6. Three sheets shall be taken from each annealing box to represent the top, middle, and bottom of the stack, or 1 sheet from each 25 when sheets are open annealed. One tensile, one bend, and on reverse bending test shall be made from each sheet selected.

DIMENSIONS AND TOLERANCES.—7. The dimensions and tolrances shall be those given in the table below and in the specifications 3S11. The thickness will be specified in decimals of an inch or millimetres.

DELIVERY, PACKING, AND SHIPPING.—8. (*a*) Sheets shall be cut to the required dimensions and shall be ordered in as narrow widths as can be used.

(*b*) All sheets shall be oiled for protection against corrosion,

(*c*) Sheets 0.065 in. (1.65 mm.) or thinner, shall be boxed. the weight of box with contents not to exceed 220 lb. (100 kg.).

(*d*) Sheets thicker than 0.065 in. (1.65 mm.), up to and including 0.125 in. (3.18 mm.), shall be crated, the weight of crate and contents not to exceed 220 lb. (100 kg.).

(*e*) Sheets thicker than 0.125 in. (3.18 mm.), may be bundled, the weight of bundle not to exceed 220 lb. (100 kg.).

CHEMICAL COMPOSITION OF STANDARD STEEL.

Number.	Carbon.	Manganese.	Phosphorus, maximum.	Sulphur, maximum.
1030	0.25–0.35	0.50–0.80	0.045	0.050
1035	0.30–0.40	0.50–0.80	0.045	0.050

When electric or crucible furnace steel is specified in the order, the maximum allowable percentages of phosphorus and sulphur may, at the option of the purchaser, be limited to 0.03 per cent.

TABLE OF TOLERANCES FOR STANDARD STEEL SHEETS.

Thickness.		Tolerance for sheets 14 ins. (35.6 cm.) wide and under.		Tolerance for sheets over 14 ins. (35.6 cm.) wide.	
Ins.	Mm.	Ins.	Mm.	Ins.	Mm.
0–0.020	0.51	+0.001 −0.002	+0.03 −0.05	±0.002	±0.05
0.021–0.030	0.54–0.76	+0.002 −0.003	+0.05 −0.08	±0.003	±0.08
0.031–0.040	0.79–1.02	±0.003	±0.08	±0.003	±0.08
0.041–0.050	1.05–1.27	±0.003	+0.08	±0.004	±0.10
0.051–0.065	1.30–1.65	±0.004	±0.10	±0.004	±0.10
0.066–0.080	1.68–2.03	±0.004	±0.10	±0.005	±0.13
0.081–0.100	2.06–2.54	±0.006	±0.15	±0.006	±0.15
0.101–0.120	2.57–3.05	±0.006	±0.15	±0.007	±0.18
0.121–0.250	3.08–6.35	±0.006	±0.15	±0.008	±0.20

3S26—*Specifications for Soft Carbon Steel Sheet.*

GENERAL.—1. The general specifications, 1G1, shall form, according to their applicability, a part of these specifications.

MATERIAL.—2. The material for these sheets shall be chosen from the I.A.S.B. standard steels listed below. The composition shall be stated by the manufacturer or contractor, and is further limited as follows :—Carbon, not over 0.30 per cent. ; manganese may be from 0.30 to 0.60 per cent.

MANUFACTURE.—3. (*a*) The steel shall be manufactured, or at least finished, by the open-hearth, electric-furnace, or crucible process.

(*b*) A sufficient discard shall be made from each ingot to secure freedom from piping and undue segregation.

(*c*) Sheets, unless ordered cold rolled, shall be full pickled.

Heat Treatment.—(*d*) Sheets are to be well and uniformly annealed, in accordance with good commercial practice. For sheets lighter than 0.065 in. (1.65 mm.), box annealing is preferred. For sheets 0.065 in. (1.65 mm.) and thicker, open annealing is preferred.

WORKMANSHIP AND FINISH.—4. (*a*) The sheets must be commercially flat, clean, smooth, free from seams, laminations, blisters, and other surface defects. They must be uniform in quality, and within the stipulated margins of manufacture.

(*b*) Any sheet may be rejected because of injurious defects or faults in manufacture at any time, notwithstanding that it has previously been accepted by the inspector ; it shall be returned to the manufacturer at the latter's expense. This clause shall not be taken to apply to materials fabricated after export.

PHYSICAL PROPERTIES AND TESTS.—5. (*a*) Specimens cut in any direction from the sheets shall have the following properties :—

Tensile Test.—(*b*) Minimum tensile strength, 60,000 lb. per sq. in. (42.18 kg./mm.²) ; minimum yield point, 36,000 lb. per sq, in. (25.31 kg./mm.²) ; minimum elongation, 22 per cent. in 4 ins. (101.6 mm.).

Bend Tests.—(*c*) Strips cut from sheets shall stand being bent cold through an angle of 180 deg. in any direction to a radius equal to the thickness of the sheet without fracture.

(*d*) Strips 1¼ in. (31.75 mm.) wide cut from sheets and with edges rounded shall reverse bending, cold, through an angle of 90 deg. for not less than three complete reversals without fracture. The test is to be made in a square-nose vice, the edges over which the specimen is bent being rounded to a radius equal to three times the thickness of the sheet.

SELECTION OF TEST SPECIMENS.—6. Three sheets shall be taken from each annealing box to represent the top, middle, and bottom of the stock, or one sheet from each 25, when sheets are open annealed. One tensile, one bend, and one reverse bending test shall be made from each sheet selected.

DIMENSIONS AND TOLERANCES.—1. (*a*) The dimensions and tolerances shall be those given in the table below and in the specifications 3S11. The thickness will be specified in decimals of an inch or millimetres.

DELIVERY, PACKING, AND SHIPPING.—8. (*a*) Sheets shall be cut to the required dimensions and shall be ordered in as narrow widths as can be used.

(*b*) All sheets shall be oiled for protection against corrosion.

(*c*) Sheets 0.065 in. (1.65 mm.) or thinner shall be boxed, the weight of box with contents not to exceed 220 lb. (100 kg.).

(*d*) Sheets thicker than 0.065 in. (1.65 mm.), up to and including 0.125 in. (3.18 mm.), shall be crated, the weight of crate and contents not to exceed 220 lb. (100 kg.).

(*e*) Sheets thicker than 0.125 in. (3.18 mm.) may be bundled, the weight of bundle not to exceed 220 lb. (100 kg.).

COMPOSITION OF STANDARD STEELS.

Number.	Carbon.	Manganese.	Phosphorus, maximum.	Sulphur, maximum.
1020	0.15–0.25	0.30–0.60	0.045	0.050
1025	0.20–0.30	0.50–0.80	0.045	0.050

When electric or crucible furnace steel is specified in the order, the maximum allowable pereentage of phosphorus and sulphur may, at the option of the purchaser, be limited to 0.03 per cent.

TABLE OF TOLERANCES FOR STANDARD STEEL SHEETS.

Thickness.		Tolerance for sheets 14 ins. (35.6 cm.) wide and under.		Tolerance for sheets over 14 ins. (35.6 cm.) wide.	
Ins.	Mm.	Ins.	Mm.	Ins.	Mm.
0–0.020	0.51	+0.001 −0.002	+0.03 +0.05	±0.092	±0.05
0.021–0.030	0.54–0.76	+0.002 −0.003	+0.05 −0.08	±0.003	±0.08
0.031–0.040	0.79–1.02	±0.003	±0.08	±0.003	±0.08
0.041–0.050	1.05–1.27	±0.003	−0.08	±0.004	±0.10
0.051–0.065	1.30–1.65	±0.004	±0.10	±0.004	±0.10
0.066–0.080	1.68–2.03	±p.004	±0.10	±0.005	±0.13
0.081–0.100	2.06–2.54	±0.006	±0,15	±0.006	±0.15
0.101–0.120	2.57–3.05	±0.006	±0.15	±0.007	±0.18
0.121–0.250	3.08–6.35	±0.006	±0.15	±0.008	±0.20

(*To be continued.*)

Fatal Accident at Spanish Aerodrome.

WHILE flying at a low altitude over the Cuatrovientos aerodrome, a Spanish aviator, Capt. Souza, dashed into a platoon of soldiers. It is reported that three persons were killed, while seven others were injured.

The Cause of Muller's Death.

As recorded in our last issue the first reports of the death of Max Muller, the crack German pilot, said that he was killed in an accident which was caused by engine failure. It is now stated by the *Cologne Gazette* that according to a letter received by his brother, Muller landed as a result of his machine being damaged in an air fight, and he was then fatally injured by a bomb thrown at him.

Spies in American Aerodromes.

AMONG the haul of spies reported from New York on January 15th was Walter Sporrman, a lieutenant in the German Navy, who was caught red-handed while endeavouring to blow up the magazine at the Hampton Aviation Base in Virginia. He obtained work at the aerodrome a few days, but, when he was seen going near the magazine sentries fired on him and he escaped. On making another attempt a few days later, however, he was arrested.

FLIGHT

The British Air Services

"PER ARDUA AD ASTRA"

UNDER this heading are published each week the official announcements of appointments and promotions affecting the Royal Naval Air Service and the Royal Flying Corps (Military Wing) and Central Flying School. These notices are not duplicated. By way of instance, when an appointment to the Royal Naval Air Service is announced by the Admiralty it is published forthwith, but subsequently, when it appears in the LONDON GAZETTE, *it is not repeated in this column.*

Royal Naval Air Service.

Admiralty, January 15th.

2nd Writer (R.N.V.R.).—W. Hall, entered as Prob. Flight Officer (temp.) seniority Jan. 21st.

Prob. Flight Officer.—G. F. Kennedy, granted temp. commission as Sub-Lieut. (R.N.V.R.), seniority Jan. 2nd (appt. as Prob. Flight Officer terminated).

Sub-Lieutenant, R.N.V.R. (Temp.).—W. D. Redmond, entered as Prob. Flight Officer (temp.), seniority Dec. 9th.

Warrant Officer (11).—R. Frater, granted temp. commission as Lieut. (R.N.V.R.), seniority Jan. 2nd (appointed as W.O. 11 terminated).

The following ranks have been granted temp. commissions as Lieut.(R.N.V.R.), seniority Jan. 2nd :—C.P.O., 11 (G.).—A. B. Kennair; A.C.1 (W.).—A. J. Spelling; A.C. (11).—A. H. Tapper; and T. Davis; L.A.C.—W. P. Suttle; Act. A.M.1 (G.).—A. Shelley.

A.C.1 (W.).—A. L. Rhys-Evans, granted temp. commission as Sub-Lieut. (R.N.V.R.), seniority Jan. 28th.

The following have been entered as Prob. Flight Officers (temp.) :—F. Holroyd, C. D. Gee, L. R. Abes, W. W. Inglis, C. W. J. Leng, T. F. Clarke, C. H. Beech, R. G. Haggarty, C. F. Lord, and E. T. Martin.

G. C. Fenton and T. R. W. Bulkeley, both entered as Prob. Observer Officers (temp.), seniority Jan. 21st.

Admiralty, January 18th.

Lieutenant-Commander, R.N.V.R. (Temporary).—W. D. Smiles, D.S.O., promoted to Commr. (Temp.), seniority Jan. 10th.

Lieut., R.N.V.R. (Temp.).—The Hon. J. R. B. Balfour, promoted to Lieut.-Commr. (Temp.), seniority Jan. 10th.

The following Temp. Sub-Lieuts., R.N.V.R. (Act. Lieuts.), have been promoted to Lieuts. (Temp.), seniority Jan. 10th :—A. W. Southam, J. MacDowell, E. W. Benson, and J. Macky.

Prob. Flight Officer (Temporary).—R. A. Pettite, entered as Obs. Officer (Temp.), seniority Oct. 7th, 1917.

The following have been entered as Prob. Flight Officers (temp.) :—H. M. Keith, K. P. Kirkwood, C. M. le Moine, A. M. McElhinney, W. A. McLeod, J. A. MacDonald, R. J. R. Morrison, A. J. O'Neill, C. A. Parker, J. A. Phillips, E. J. Ralph, I. J. Rubinovich, J. R. Smith, H. A. Sutherland, J. E. Taylor, D. B. Aitchson, H. Black, C. T. L. Blakeney, J. M. Catto, H. G. Clappinson, W. A. Crick, H. C. Curtis, M. R. Fitzegerald, A. Grimshaw, W. G. A. Hallick, G. A. Hodgetts, A. E. Hounson, F. L. Hutchinson, F. W. Ings, C. W. Treleaven, T. D Vezina, F. W. Wright, J. B. Atherton, L. O'B. Bagnall, L. N. Bissell, C. H. Clarke, P. J. R. Carter, G. A. Dempsey, W. Dickenson, E. A. Freitag, P. H. Goodhugh, W. G. Stevens, R. J. Gee, P. G. Greenslade, C. F. S. Jackson, C. W. S. James, V. E. Jackson, G. G. Marsland, J. W. Maidment, C. Norris, L. Bailey, E. R. Plant, H. Simon, J. C. Sorley, A. R. Thatcher, F. J. Turney, D. F. Tyse, M. Walker, W. D. Walker, E. M. Lomax, F. L. Southgate, C. Homewood, J. M. Stevenson, B. Hinkler, R. G. Haye, L. J. Holland, J. W. Hartley, E. B. Hyndman, R. W. Johnson, K. J. G. Bellamy, R. W. Curtis, A. G. Davidson, F. J. Ellis, B. Fletcher, and S. A. Grimwade.

Mr. H. Cox entered as Sub-Lieut., R.N.V.R. (temp.), seniority Dec. 30th.

Mr. W. W. Ball entered as Wt. Officer, 2nd grade (temp.), seniority Dec. 30th.

Messrs. R. G. Gore and F. W. Boggis both promoted to Wt. Officers (11), seniority Jan. 15th.

Messrs. C. C. Porter, G. Bucknall, E. F. Hedge, all granted temp. comm. as Sub-Lieut., seniority Jan. 10th.

Mr. F. H. Kemp granted rank of Wt. Officer, 11 (temp.), seniority Jan. 15th.

Admiralty, January 19th.

Engineer Sub-Lieutenant, R.N.R. (Temporary).—C. W. Tayton Taylor, entered as Prob. Flight Officer (temp.), seniority Dec. 30th.

Royal Flying Corps (Military Wing).

London Gazette Supplement, January 15th.

The following appointments are made :—

Wing Commander.—Capt. (Temp. Maj.) M. G. Christie, D.S.O., M.C., S.R., from a Sqdn. Comdr., and to be Temp. Lieut.-Col. whilst so employed; Jan. 1st.

Flight Commanders.—From Flying Officers :—Capt. N. C. Riddell, R. Sco. (T.F.); Oct. 2nd, 1917. Capt. R. H. Shears, Shrops. L.I.; Oct. 18th, 1917. And to be Temp. Capts. whilst so employed :—Lieut. C. E. Sherwin, M.C., R.E. (T.F.); June 12th, 1917. Lieut. F. A. Bates, Yeo. (T.F.); Aug. 14th, 1917. Lieut. P. W. Snell, S.R.; Aug. 31st, 1917. Temp. Lieut. L. H. Stowell, Gen. List; Sept. 12th, 1917). Temp. 2nd Lieut. K. G. Selanders, Gen. List; Sept. 15th, 1917. Temp. 2nd Lieut. H. I. Hadmer, Gen. List; Sept. 25th, 1917, Lieut. R. E. Buckingham, M.C. S.R.; Nov. 21st, 1917. Lieut. E. B. Rice, R. Dub. Fus.; Dec. 19th, 1917.

Flying Officers.—Lieut. B. E. Turney, Lond. R. (T.F.), and to be secd.; Oct. 12th, 1917. Temp. 2nd Lieut. W. Steele, Gen. List; Nov. 1st, 1917. Lieut. J. S. Bowker, Manch. R. (T.F.); Nov. 3rd, 1917. 2nd Lieut. R. P. Pope, E. Surr. R. and to be secd.; Nov. 13th, 1917. Temp. 2nd Lieut. G. W. P. Avery, A.S.C., and to be transfd. to R.F.C. Gen. List; Nov. 18th, 1917. Temp. Capt. C. G. Bellord, A. Cyclist Corps, and to be transfd. to R.F.C. Gen. List; Temp. Lieut. C. Gattens, R.E.; Nov. 22nd, 1917. Lieut. H. J. F. Alexander, R.F.A. (T.F.), and to be secd.; 2nd Lieut. C. L. Middleton, R.W. Kent R. (T.F.), and to be secd.; Nov. 24th, 1917. Temp. 2nd Lieut. H. F. Andrew, R.E.; Nov. 26th, 1917. Lieut. G. H. Wenn, R.F.A. (T.F.), from a Flying Officer (Obs.); Dec. 19th, 1917, seniority from Feb. 16th, 1917. Lieut. S. C. Burt, Canadian Exped. Force; Lieut. T. W. McConkey, Canadian Local Force, from a Flying Officer (Obs.), seniority from March 20th, 1917; Dec. 20th, 1917. Lieut. C. M. McCann, Canadian M.G. Corps; Capt. J. G. Garneau, Canadian A.P.C.; Dec. 22nd, 1917. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank :—P. R. Hampton; Sept. 22nd, 1917. C. W. Lewis; Oct. 22nd, 1917. H. R. Junor; Oct. 28th, 1917. T. F. Campbell, R. J. Divers; Nov. 4th, 1917. A. G. Oliver; Nov. 6th, 1917. C. J. M. Evans; Nov. 8th, 1917. A. C. Tremellen; Nov. 28th, 1917. J. V. Audas; Dec. 11th, 1917. J. M. Hancock; Dec. 17th, 1917. F. R. Pearce, C. C. Allinson, K. M. A. Ramsay; Dec. 19th, 1917. T. B. Dickson, G. Wood, N. F. Purser; Dec. 20th, 1917.

Flying Officers (Observers).—2nd Lieut. W. P. Busher, R. Ir. R. (S.R.), and to be secd.; Nov. 21st, 1917 (seniority from Aug. 6th, 1917). Lieut. L. Harper, R. Ir. Rif. (S.R.), and to be secd.; Nov. 20th, 1917, seniority from Aug. 8th, 1917. Lieut. W. H. Raikes, Canadian Exped. Force; Nov. 21st, 1917, seniority from Aug. 15th, 1917. 2nd Lieut. J. F. G. Boyle, K.O.S.B., seniority from Aug. 22nd, 1917, and to be secd.; Temp. Lieut. H. A. Samson, R.W. Surr. R., seniority from Sept. 3rd, 1917, and to be transfd. to R.F.C. Gen. List; Nov. 20th, 1917. Temp. Lieut. E. L. Barrington, M.C., Devon R., seniority from Sept. 10th, 1917, and to be transfd. to R.F.C. Gen. List; Temp. Capt. H. W. E. Barwell, M.C., R. War. R., seniority from Oct. 11th, 1917, and to be transfd. to R.F.C. Gen. List; Temp. 2nd Lieut. (on prob.) P. Harvey, Gen. List, seniority from Sept. 17th, 1917, and to be confirmed in his rank; Nov. 21st, 1917. Temp. Lieut. A. J. Cox, R. Innis. Fus., and to be transfd. to R.F.C., Gen. List; Nov. 11th, 1917, seniority from Aug. 8th, 1917. 2nd Lieut. D. McK. Finlayson, Camn. Highrs. (T.F.), and to be secd.; Oct. 8th, 1917, seniority from Aug. 8th, 1917. 2nd Lieut. E. C. Booker, R.F.A. (T.F.), and to be secd.; Oct. 19th, 1917, seniority from Aug. 19th, 1917. Nov. 8th, 1917, seniority from Sept. 8th, 1917 :—Temp. Lieut. C. E. V. Graham, R.A., and to be transfd. to R.F.C. Gen. List; Lieut. D. J. Aitchison, R.F.A. (T.F.), and to be secd.

Equipment Officers, 1st Class.—Lieut. F. G. Brown, R.F.A. (T.F.), from the 2nd Class, and to be Temp. Capt. while so employed; June 1st, 1917. 2nd Class.—From the 3rd Class.—Lieut. D. Easdale, S.R.; Aug. 1st, 1917. Lieut. F. Gilbert, D. of Corn, L.I. (T.F.); Oct. 6th, 1917. Temp. Lieut. S. Purkiss, Ginn, Essex R.; Nov. 1st, 1917. Lieut. F. Leach, Manch. R. (T.F.), Temp. Lieut. A. E. Young, Gen. List; Nov. 16th, 1917. Capt. P. C. Franklin, A.S.C. (T.F.); Nov. 27th, 1917. Lieut. W. R. Lewis, S.R.; Dec. 1st, 1917. Capt. E. F. Hirtzel, Welsh R., S.R.; Dec. 7th, 1917. Temp. Lieut. A. J. O. Spiers, Gen. List; Lieut. J. H. Robertson, S.R.; Dec. 8th, 1917. Lieut. J. Page, S.R.; Dec. 20th, 1917. Lieut. F. G. Seabrooke, S.R.; Capt. W. T. Taylor, N. Lan. R. (T.F.); Lieut. G. P. Achurch, S.R.; Jan. 1st. And to be Temp. Lieuts. while so employed :—2nd Lieut. H. F. Wilkinson, S.R.; Sept. 24th, 1917. Temp. 2nd Lieut. E. C. Rumford, Gen. List; Sept. 30th, 1917. Temp. 2nd Lieut. S. W. Gilbey, Gen. List; Nov. 1st, 1917. 2nd Lieut. W. L. Shaw, S.R.; Nov. 12th, 1917. 2nd Lieut. H. B. Golding, S.R.; Temp. 2nd Lieut. L. M. Page, Gen. List; 2nd Lieut. S. F. Feast, S.R.; Jan. 1st. 3rd Class.—Qrmr. and Hon. Lieut. (Temp. Capt.) J. Ramsay, M.C., relinquishes his temp. rank and is restored to the establishment; Jan. 7th. The appointment of Temp. 2nd Lieut. J. E. Liddiatt, Gen. List, notified in the *Gazette* of Jan. 1st, is post-dated to Dec. 4th, 1917.

School of Instruction—School of Technical Training.

Company Commanders.—(Graded as Equipment Officers, 2nd class).—Lieut. G. E. Etheridge Suff. R., T.F., and to be secd. And to be Temp. Lieuts. whilst so employed :—2nd Lieut. L. L. Wight, M.C., R. Surr. R., and to be secd. Temp. 2nd Lieut. G. W. Allen, Gen. List; Sept. 24th, 1917.

General List.—Temp. 2nd Lieut. D. A. McRae resigns his commission; Jan. 16th. The Christian names of Temp. 2nd Lieut. Henry George Moon are as now described, and not as in the *Gazette* of Oct. 12th, 1917. Temp. 2nd Lieut. (on prob.) D. W. Small is confirmed his rank. Cadets to be Temp. 2nd Lieuts. (on prob.) :—H. G. Achurch L. E. Allanson E. H. Alliott, R. Alton, C. W. Arning, H. Arnfield, E. O. W. Ayles, J. Barker, E. G. Barratt, W. H. Basker, J. W. Beeson, D. Benzies, J. G. Bertrand, H. W. Bingham, A. G. S. Blake, E. C. Bolton, C. J. V. Bowles, C. L. Bowley, A. H. Bradley, J. J. Browne, F. Browne, J. Bullough, E. J. Burton, S. E. Burden, E. A. Burden, L. T. Caithness, D. W. Campbell, H. Chadwick, W. L. Chapman, L. L. Champan, V. G. Cheesman, J. Chesters, A. Chettle, E. S. B. Clarke, S. Clark, D. A. Collin, F. R. Cooke, J. Cooke, F. J. A. Cooper, R. A. Coulthurst, H. E. Cowley, J. W. Cox, W. H. Dibben, P. Dickens, W. Dixon, E. P. Dodsworth, J. C. G. Drummond, L. Duncombe, W. A. Erskine, J. Evans, W. Fillery, C. R. Fisher, W. Fitzpatrick, F. Fraser, E. P. Gates, W. O. Goldthorpe, H. C. B. Good, C. N. Gould, G. W. Graham, L. W. Greenwood, R. J. Gwilliam, W. A. Harris, T. Hartford, F. W. Hatton, A. C. S. Hawkins, H. D. Hayes, R. E. Heater, H. J. Heddle, E. H. Henson, W. H. Hoskins, W. A. Hunter, J. Joy, L. B. Jupp, T. Lees, W. E. Lindsay, N. Little, C. L. Lowe, G. Lyles, B. C. McDougall, J. MacD. MacKinnon, L. Marriott, W. McCullagh, I. R. R. Mellish, J. McLennan, T. W. B. Mill, R. M. Miller, A. A. Mitchell, F. M. Montocchio, J. L. McI. Oliphant, H. S. Orange, J. Owen, J. W. V. Payne, F. B. Peacock, T. H. Pearson, L. S. Potter, G. Read, C. H. Rice, W. R. Richardson, J. P. Robertson, A. E. Sharp, J. P. Sharp, H. W. Sheard, J. H. Sims, L. Skeldon, H. Smith, M. de L. Staunton, J. W. Stevens, M. Tallentire, G. S. Taylor, H. F. Taylor, F. P. Taylor, J. C. Thomson, R. Tindle, A. W. Todd, C. W. Tolson, C. V. Towns, H. W. G. Triggs, A. Tyler, H. G. C. Verge, D. W. S. Waite, T. Waitt, W. W. W. Walker, R. P. Waller, N. C. Waltho, R. G. Walton, H. Wheat, J. B. Wickham, L. T. Wilson, F. C. Wilton, G. E. C. Wisdom, W. F. M. Wise, A. S. Withers, I. A. Wright, C. N. Wylam; Jan. 5th.

London Gazette Supplement, January 16th.

The following appointments are made :—

Special Appointments.—(Graded for purposes of pay as a Staff Capt. whilst employed as Brig. Signalling Officer).—Capt. H. A. Porter, R.G.A., T.F., and to be secd.; Nov. 19th, 1917.

Flying Officers.—Lieut. J. W. McDonald, Canadian Exped. Force; Dec. 17th, 1917. Temp. Lieut. M. J. Langley, R.A., and to be transfd. to R.F.C. Gen. List; Dec. 24th, 1917. 2nd Lieut. B. Henegan, Arg. and Suth'd Highrs., S.R., and to be secd.; Dec. 27th, 1917. Temp. and Lieuts. (on prob.), Gen. List, and to be confirmed in their rank :—F. G. Bayley; Dec. 15th, 1917. S. B. Bradley; Dec. 27th, 1917. The appointment of Temp. 2nd Lieut. R. G. Hart, Gen. List, notified in *Gazette* of Jan. 7th, is antedated to Dec. 4th, 1917.

Flying Officers (Observers).—Temp. Lieut. C. E. Wharran, S. Staff. R., and to be transfd. to R.F.C., Gen. List; Nov. 24th, 1917; seniority, Aug. 6th, 1917. Temp. Lieut. E. E. Howard, attd. R. W. Fus., and to be transfd. to R.F.C. Gen. List; Nov. 23rd, 1917, seniority Sept. 17th, 1917. Lieut. T. R. Dixon, R.F.A., S.R.; Nov. 24th, 1917, seniority Sept. 24th, 1917. Temp. 2nd Lieut. E. A. Newton, A.S.C., and to be transfd. to R.F.C., Gen. List; Oct. 1st, 1917. Nov. 24th, 1917, seniority, Oct. 3rd, 1917 :—2nd Lieut. E. J. Piggot, R.F.A., S.R. Temp. 2nd Lieut. T. E. Rogers, W. York. R., and to be transfd. to R.F.C., Gen. List. Temp. Lieut. E. G. Pole, A.S.C., and to be transfd. to R.F.C., Gen. List; Nov. 25th, 1917, seniority Oct. 4th, 1917. Temp. 2nd Lieut. G. Dixon, A.S.C., and to be transfd. to R.F.C., Gen. List; Nov. 26th, 1917, seniority Oct. 18th, 1917. Nov. 21st, 1917 :—2nd Lieut. G. D. Morris, Devon R., T.F., seniority Sept, 4th, 1917, and to be secd. Temp. Lieut F. J. Pullen, Welsh R., seniority Sept. 24th, 1917. Temp. 2nd Lieut. H. G. Wildbore, M.C., attd. Notts and Derby R., seniority Oct. 3rd, 1917, and to be transfd. to R.F.C., Gen. List. 2nd Lieut. V. C. Baker, Lond. R., T.F., seniority Oct. 4th, 1917, and to be secd. Lieut. C. H. Lewis, Middl'x R., T.F., seniority Oct. 10th, 1917, and to be secd. Seniority Oct. 11th, 1917 :—Capt. G. G. Roberts, M.C., York and Lanc. R., T.F., and to be secd. Temp. Capt. E. L. Moxey, York and Lanc. R., and to be transfd. to R.F.C., Gen. List. 2nd Lieut. R. A. Forsyth, R.F.A., S.R. Temp. 2nd Lieuts. (on prob.), Gen. List, and to confirmed in their rank :—H. Entwistle, seniority Aug. 22nd, 1917. Seniority Sept. 17th, 1917 :—R. H. Carter, R. W. St. G. Cartwright, G. W. Elderkin. G. R. Barry; Nov. 27th, 1917, seniority Aug. 6th, 1917. W. W. Dingle, Nov. 24th, 1917, seniority Sept. 3rd, 1917. I. G. Fleming; Nov. 26th, 1917, seniority Sept. 10th, 1917. O. W. Jones; Nov. 24th, 1917, seniority Sept. 17th, 1917. L. G. Warren; Nov. 25th, 1917, seniority Sept. 17th, 1917.

Inspector of Training, Training Division.—(Graded for purposes of pay as Brigade Commander).—Bt. Maj. (Temp. Brig.-Gen.) E. R. Ludlow-Hewitt, M.C., R. Ir. Rif., from a Brig. Comdr., and to retain his temp. rank whilst so employed; Nov. 7th, 1917. (Substituted for the notification in the *Gazette* of Nov. 24th, 1917.)

Equipment Officers, 3rd class.—Temp. 2nd Lieut. J. Darwen, Gen. List; Nov. 22nd, 1917. (Substituted for the notification in the *Gazette* of Dec. 24th, 1917.) Temp. Lieut. C. T. Keble, Gen. List; Sept. 19th, 1916.

General List.—To be Temp. 2nd Lieuts. (on prob.):—W. H. Carpenter, late Lieut. R.N.V.R.; Dec. 4th, 1917. J. R. Rayneau, late Lieut., Ind. Army Res. of Off.; Dec. 28th, 1917.

London Gazette Supplement, January 17th.

The following appointments are made:—

Wing Commanders.—From Sqdn. Comdrs., and to be Temp. Lieut.-Cols. whilst so employed:—Capt. (Temp. Major) C. W. Wilson, M.C., Sea. Highrs. Dec. 18th, 1917. Capt. (Temp. Major) W. H. Primrose, Arg. and Suth'd Highrs., T.F.; Dec. 30th, 1917.

Flight Commanders.—From Flying Officers.—Capt. D. F. Massy, Ind. Cav.; Jan. 3rd. And to be Temp. Capts. whilst so employed:—Temp. Lieut. G. M. Cox, Gen. List; Dec. 31st, 1917. Temp. 2nd Lieut. F. Maden, Gen. List; Jan. 4th.

Flying Officers.—Lieut. S. E. Young, Canadian Exped. Force; Dec. 22nd, 1917. 2nd Lieut. C. A. Hore, M.C., N. Staff.; Dec. 31st, 1917. Temp. 2nd Lieut. A. Cunningham-Reid, R.E.; Jan. 1st.

Temp. 2nd Lieuts. (on prob.) Gen. List, and to be confirmed in their rank:—N. R. McCord, W. H. Barlow, G. C. Draper; Nov. 24th, 1917. R. M. J. Bate, S. V. V. Hiscot; Nov. 25th, 1917. T. Longman; Nov. 26th, 1917. S. S. Moore; Nov. 30th, 1917.

From Flying Officers (Observers) Dec. 17th, 1917:—Lieut. J. T. Quick, Devon R., T.F., seniority Oct. 26th, 1916. Temp. 2nd Lieut. C. T. E. Smith, Gen. List, seniority Feb. 3rd, 1917. Temp. Lieut R. O. Williams, Gen. List; Dec. 19th, 1917, seniority Nov. 18th, 1917. Temp. 2nd Lieut. C. St. C. Acheson, Gen. List; Dec. 20th, 1917, seniority Oct. 12th, 1916. Lieut. A. N. Mitchell, A.S.C.; Dec. 22nd, 1917, seniority Aug. 24th, 1916. Lieut. T. G. Jefferies, R.F.A., S.R.; Dec. 22nd, 1917, seniority Jan. 24th, 1917.

Flying Officers (Observers),—2nd Lieut. M. Bird, Essex R., S.R. Res., and to be secd.; Nov. 4th, 1917, seniority July 30th, 1917. 2nd Lieut. C. E. Stewart, R.F.A., S.R.; Nov. 7th, 1917, seniority Sept. 17th, 1917. Lieut. W. H. M. Wardrope, Canadian Cav.; Nov. 21st, 1917, seniority Sept. 18th, 1917. Temp. 2nd Lieut. F. T. Russell, Gen. List; Nov. 13th, 1917, seniority Oct. 3rd, 1917. Temp. Lt. P. W. Malthouse, A.P. Dept., and to be transfd. to R.F.C. Gen. List; Lt. L. C. Diespecker, M.C., R.F.A., S.R.; Nov. 30th, 1917, seniority Oct. 11th, 1917. Lieut. R. S. Mackenzie, Canadian Exped. Force; Nov. 30th, 1917, seniority Oct. 18th, 1917. Lieut. J. S. Russell-Rigby, Canadian Exped. Force, Temp. Lieut. B. L. Blomley, R. Lanc. R., and to be transfd. to R.F.C. Gen. List; Nov. 29th, 1917, seniority Oct. 4th, 1917. 2nd Lieut. P. W. Leycester, A.S.C., and to be secd.; Nov. 28th, 1917, seniority Oct. 12th, 1917. Temp. Capt. L. R. Speakman, A.S.C., and to be transfd. to R.F.C. Gen. List, 2nd Lieut. N. McEachran, High. L.I., S.R., from Labour Corps; Dec. 24th, 1917, seniority Nov. 11th, 1917.

Temp. 2nd Lieuts (on prob.), Gen. List, and to be confirmed in their rank:—F. H. Dormer; Nov. 4th, 1917, seniority Sept. 17th, 1917. J. O. M. Turnbull, O. E. Ward; Dec. 26th, 1917, seniority Sept. 17th, 1917. L. C. S. Tatham; Dec. 26th, 1917, seniority Oct. 18th, 1917. R. A. Pendry; Dec. 24th, 1917, seniority Oct. 19th, 1917.

Instructor in Gunnery (Graded as an Equipment Officer, 1st class).—Capt. P. K. Paul, High. L.I., S.R., from an Instr. in Gunnery (graded as an Equipmt. Offr., 2nd cl.; Nov. 1st, 1917.

Assistant Instructors in Gunnery (Graded as Equipment Officers, 2nd class).—From Asst. Instr. in Gunnery (graded as Equipmt. Offrs., 3rd cl.):—Temp. Lieut. G. M. Garro-Jones, Gen. List, Temp. Lieut. J. T. Kyffin, Gen. List; Oct. 22nd, 1917. Lieut. F. W. Partington, S. Lan. R., S.R., from an Asst. Instr. in Gunnery (graded as an Equipmt. Offr., 3rd cl.), Schools of Aerial Gunnery; Nov. 1st, 1917. Temp. 2nd Lieut. A. G. Edwards, Gen. List, from an Asst. Instr. in Gunnery (graded as an Equipmt. Offr., 3rd cl.), and to be Temp. Lieut. whilst so employed; Dec. 1st, 1917.

Adjutant.—The appointment of Temp. Lieut. G. H. L. Sweet, North'd Fus., notified in *Gazettee* of Aug. 28th, 1917, is antedated to June 26th, 1917.

Equipment Officers, 1st class.—2nd Lieut. J. W. Carter, Midd'x R., T.F., to be secd., and to be Temp. Capt. whilst so employed; Oct. 4th, 1917.

2nd Class.—2nd Lieut. A. Chapple, S.R., from the 3rd cl., and to be temp. Lieut. whilst so employed; Nov. 1st, 1917.

3rd Class.—2nd Lieut. L. V. Rothschild, S.R., from March 1st, to 5th, 1917, Lieut. F. A. I. Richardson, Linc. R., S.R., and to be secd., Temp. 2nd Lieut. H. E. Randall, York. R., and to be transfd. to R.F.C. Gen. List, Temp. 2nd Lieut. T. F. Morris, Lab. Corps, and to be transfd. to R.F.C. Gen. List; Dec. 6th, 1917. Temp. Lieut. P. W. Day, attd. Durh. L.I., and to be transfd. to R.F.C. Gen. List, Temp. 2nd Lieut. J. B. Glass, North'd Fus., and to be transfd. to R.F.C., Gen. List, 2nd Lieut. F. P. Cleaver, R.A., and to be secd.; Dec. 10th, 1917.

Temp. 2nd Lieuts. (on prob.) Gen. List and to be confirmed in their rank—J. L. Geddes; Nov. 1st, 1917. M. J. Paton, D. C. Buchan; Dec. 1st, 1917. F. R. Brighten, L. E. Currey, S. W. Crawford; Dec. 10th, 1917.

The appointment of Temp. 2nd Lieut. (now Temp. Major) B. G. White, R.E., notified in *Gazette* of Feb. 2nd, 1917, is cancelled.

Experimental Officer 2nd Class.—(Graded as an Equipment Officer 2nd class).—Temp. Lieut. H. E. O. Ellis, M.C., R.E., from an Experimental Offr., 3rd cl. (graded as an Equipmt. Offr. 3rd cl.); Jan. 1st.

Schools of Instruction.

Schools of Military Aeronautics.—Assistant Instructor.—(Graded as an Equipment Officer 2nd class).—2nd Lieut. (Temp. Lieut.) W. A. Verner-Furlong, S.R., as Equipmt. Offr., 2nd cl., and to retain his Temp. rank; Dec. 25th, 1917.

General List.—Temp. 2nd Lieut. E. C. Fulton, to be Temp. Lieut; Dec. 9th, 1917. J. R. Hovenden, late Temp. 2nd Lieut. to be Temp. 2nd Lieut.; Dec. 28th, 1917.

London Gazette Supplement, January 18th.

Attached to Headquarters Units.

Brigade Commander.—Bt. Lieut.-Col. (Temp. Brig.-Gen.) D. le G. Pitcher, C.M.G., Ind. Cav., and to retain his temp. rank whilst so employed; Dec. 27th, 1917.

The following appointments are made:—

Special Appointment (graded as a Group Commander).—Capt. (Temp. Lieut.-Col.) A. E. Borton, D.S.O., R. Highrs., from a Wing Comdr., and to be Temp. Col. whilst so employed; Nov. 21st, 1917.

Flight Commanders.—Temp. Major I. U. D. Truman, Gen. List, from Chief Instr. (graded as a Park Comdr.) at the Sch. of Tech. Trg., and to revert to the rank of Temp. Capt.; Dec. 31st, 1917. Capt. C. W. Baldwin, Durh. L.I., T.F., from a Flying Officer; Jan. 4th. From Flying Officers, and to be Temp. Capts. whils eo employed:—Temp. Lieut. R. Erskine Gen. List. 2nd Lieut. J. M. Warnock, S.R.; Dec. 6th, 1917. Temp. Lieut. E. L. L. Turnbull, R.E.; Dec. 19th, 1917. 2nd Lieut. H. F. S. Drewitt, S.R.; Dec. 28th, 1917.

Flying Officers.—Temp. 2nd Lieut. St. J. S. Backhouse, A. Cyc. Corps, and to be transfd. to R.F.C., Gen. List; Sept. 25th, 1917. Temp. Lieut. A. Boyle, M.C., Gen. List, from a Flying Officer (Obs.), seniority Jan. 11th, 1917. 2nd Lieut. N. C. Bennison, Lond. R., T.F. and to be secd.; Dec. 18th, 1917. Temp. W. T. Gilson, Gen. List, from a Flying Officer (Obs.), seniority Oct. 29th, 1916. Temp. 2nd Lieut. W. T. Jourdan, Gen. List, fron a Flying Officer (Obs.), seniority Aug. 29th, 1916; Dec. 19th, 1917. 2nd Lieut. A. Latimer, R.F.A., S.R.; Dec. 21st, 1917. Temp. 2nd Lieut. F. G. Taylor, Gen. List, from a Flying Officer (Obs.), seniority Jan. 22nd, 1917, Temp. 2nd Lieut. C. M. Maud, R.A., and to be transfd. to R.F.C., Gen. List., 2nd Lieut. G. Hackett, A. Cyc. Corps, and to be secd., Temp. 2nd Lieut. H. P. M. Kesterton, M.C., R. W. Fus., and to be transfd. to R.F.C., Gen. List, 2nd Lieut. R. H. Walker, N. Lan. R., T.F., and to secd.; Dec. 23rd, 1917. Lieut. E. Harrison, R.E., T.F.; Dec. 24th, 1917. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—J. F. Kneale; Nov. 12th, 1917. R. I. Mansel-Edwards; Dec. 13th, 1917. P. G. Goodger, R. Neish, S. T. Rekofski, F. R. Murray; Dec, 17th, 1917. E. A. Spicer; Dec. 18th, 1917. A. J. D. Peebles, O. H. Curry, W. H. Pickup, F. L. Munslow; Dec. 19th, 1917. E. C. Harrison, H. C. Adams; Dec. 20th, 1917. G. De Gaye, G. N. Hardwick; Dec. 21st, 1917. B. E. Gammell, V. G. Cuningham; Dec. 22nd, 1917. W. Ledlie, S. R. Pinder, J. A. Sykes, G. J. Hutcheson; Dec. 23rd, 1917. E. M. Coles; Dec. 24th, 1917. F. D. Hudson, W. C. M. Harbottle; Dec. 25th, 1917. J. H. Greathead; Dec. 26th, 1917.

Flying Officers (Observers).—Lieut. R. H. Kelly, Canadian Exped. Force; May 16th, 1917, seniority April 23rd, 1917. The appointment of 2nd Lieut. R. H. Kelly, Arg. and Suth'd Highrs., T.F., notified in the *Gazette* of June 4th, 1917, is cancelled.

Assistant Instructor in Gunnery.—(Graded as an Equipment Officer, 2nd class).—Lieut. F. A. Swoffer, Midd'x R., T.F., from an Asst. Instr. (graded as an Equipment Officer, 3rd class); Dec. 30th, 1917.

Balloon Officers.—2nd Lieut. S. Humphries, R.G.A., S.R.; Dec. 1st, 1917. Temp. 2nd Lieut. L. P. Snith, R.W. Surr. R., and to be transfd. to R.F.C., Gen. List. Temp. 2nd Lieut. E. H. Wilford; Dec. 28th, 1917.

Adjutant.—Capt. L. E. Middleton, S. Staff. R., S.R., and to be secd.; Nov. 15th, 1917.

Equipment Officers, 2nd Class.—Temp. Lieut. R. Watson, Gen. List, from the 3rd cl.; Feb. 20th, 1917. Lieut. (Temp. Capt.) R. J. Bennett, S.R., from a Flight Comdr., and to relinquish his temp. rank; Oct. 9th, 1917. 3rd Class.—Temp. Lieut. H. P. Jenkinson, Gen. List, from a Balloon Officer; July 27th, 1917. Temp. 2nd Lieut. C. F. B. Bassil, Gen. List, from a Flying Officer; Nov. 23rd, 1917. 2nd Lieut. W. Crick, Garr. Bn., Rif. Brig., T.F., and to be secd.; Dec. 11th, 1917. Temp. Lieut. F. C. Winby, Gen. List; Dec. 15th, 1917. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—W. J. Harries, J. L. Davies; Oct. 19th, 1917. A. Patterson; Nov. 10th, 1917. J. A. McMullen, R. W. L. Phillips, W. V. Wright, E. Hulme, K. V. Ross, H. H. E. Wood; Dec. 31st, 1917; E. J. Cox, G. Albert; Dec. 11th, 1917. E. W. Davis, V. C. S. Milner, R. R. Trout; Jan. 1st.

Experimental Officer, 3rd Class.—(Graded as an Equipment Officer, 3rd Class).—Lieut. P. Anderson, Arg. and Suth'd Highrs. (from an Equipmt. Officer, 3rd cl.); Dec. 14th, 1917.

Gen. List.—Temp. 2nd Lieut. D. G. Trenerry relinquishes his commission on account of ill-health, and is granted the hon. rank of 2nd Lieut.; Jan. 19th.

To be temp. 2nd Lieut.:—P. Haselock, late Temp. 2nd Lieut.; Nov. 15th, 1917. Sergt. W. J. Barr, from R.F.C.; Nov. 25th, 1917.

Cadets to be Temporary Second Lieutenants (on prob.).—W. F. Abbott, E. H. Ades, A. T. J. Anderson, S. H. Apling, L. S. Ash, E. J. Bannister, P. E. Beadle, C. Beard, H. V. Bell, F. H. H. Biddle, W. W. Blakemore, W. H. Bland, H. R. Boaston, E. V. Bond, J. E. Broadhead, R. B. Campbell, H. H. Cant, G. W. Chew, D. C. Childs, C. T. Chisnell, F. J. Church, S. S. Church, B. H. Clarke, L. B. Clarke, C. H. H. Cook, G. G. Cordiner, E. E. Crosby, A. G. Cunningham, J. H. Cuthbertson, H. D. Dade, H. C. Dalglish, D. S. Davies, G. R. A. Dick, C. Dickins, L. T. Dickson, J. Ditchfield (No. 2), V. P. Donald, J. T. Duckworth, R. H. Dunn, G. C. Easton, L. C. Eginton, L. C. Ellis, E. L. W. J. Finch, D. M. Fleming, W. Freer, J. C. Fyfe, P. H. Gange, B. C. Geary, J. H. Gidman, C. N. Glidewell, L. E. Gosden, J. H. Grahame, W. G. F. Grant, W. P. Griffiths, J. B. Gunn, A. T. Guy, J. A. L. Harris, R. C. Hardy, H. Hartley, S. T. Heath, W. E. G. Heanly, F. T. Heron, R. I. A. Hickes, A. G. Hill, A. W. Hinton, C. Hinns, P. Hopkinson, C. E. Howley, R. D. V. Howard, S. H. Hughes, John Jackson, Joseph Jackson, T. H. Jacques, G. T. Jerome, C. L. H. Johnson, F. D. Johnson, N. P. Jones, H. Kaye, C. M. Keyworth, R. G. Kirk, E. W. Langford, A. Laver, W. Leithhead, J. A. C. Lewis, W. Lewis, K. C. Long, J. MacLarty, A. J. Macqueen, W. F. Maker, E. B. Marsh, W. C. Marsh, R. R. Martin, G. J. J. Matthews, J. E. Mavity, W. E. McCulloch, I. B. M. McCulloch, W. G. McCaig, D. E. McIntosh, D. V. McLeod, P. McNaught, W. Meredith, R. E. Morton, W. Mullen, A. P. Murray, F. W. Musgrave, R. W. Napier, W. B. Newth, H. Northrop, G. B. O'Flynn, J. R. Pairman, H. Parker, G. A. A. Parsons, N. Partington, J. C. Paterson, J. M. Payne, A. L. Pearce, P. H. Perkins, T. M. Phillips, J. W. Pickering, R. S. Pilcher, P. Pilkington. P. R. Pierce, A. C. Porter, N. Price, A. L. Quarterman-Gear, G. L. Rawkins, C. H. Reay, T. C. Reddin, J. E. G. Robinson, L. R. Robertson, J. Rothera, J. J. Rowe, A. Russell, J. Sadler, T. F. Scollick, N. Selby, J. Sewell, R. H. McC. Sheppard. A. T. Start, C. A. L. Stanfield, J. C. E. Stevens, L. G. Tearle, C. E. Thorpe, G. Tiplady, W. Urwin, F. Van Praagh, J. Wallace, E. E. Watson, G. E. Watson, T. D. Watson, L. A. Whiting, W. N. Wilson, J. R. Wilson-Haffenden, C. J. Willcox, J. M. Wilkie, C. V. Wood, R. H. Wright, H. T. Wroughton, A. R. Yates; Jan. 10th.

Memorandum.—Lieut. (Temp. Major) A. C. Maund, Canadian Local Forces, a Sqd. Comdr., R.F.C., to be Temp. Lieut.-Col. (without the pay or allowances of that rank) whilst specially employed; Oct. 23rd, 1917 (substituted for the notification in the *Gazette* of Nov. 24th, 1917).

Supplementary to Regular Corps.

To be Second Lieutenants (on prob.).—C. P. Todd, G. C. Hyde, F. de M. Hyde, T. D. H. Alderton, S. R. Austin, E. N. Strain, R. Russell, R. H. Gray, W. J. Barber, R. M. De Lisle, W. G. Mitchell; Oct. 13th, 1917.

London Gazette Supplement, January 19th.

Wing Commander.—Major (Temp. Lieut.-Col.) C. Saunders, D.S.O., relinquishes his appointment and temp. rank; Jan. 15th.

The following appointments are made:—

Flying Officers.—Lieut. O. W. Lingham, Canadian Cyclist Corps; Sept. 3rd, 1917. Temp. Capt. A. B. Kynoch, Gen. List, from an Equipmt. Officer, 3rd cl. Lieut. J. E. King, Canadian Exped. Force, Temp. 2nd Lieut. (Temp. Lieut.) W. G. Scotcher, M.C., Gen. List, from a Flying Officer (Obs.), seniority Oct. 20th, 1916. Lieut. C. Osenton, Canadian Exped. Force, Temp. 2nd Lieut. W. Algie, D.S.O., Gen. List from a Flying Officer (Obs.); seniority from April 21st, 1917. Temp. 2nd Lieut. L. F. Williams, Gen. List, from a Flying Officer (Obs.); seniority from May 17th, 1917; Dec. 25th, 1917. Lieut. M. L. Howard, Canadian Exped. Force, from a Flying Officer (Obs.), seniority from Jan. 9th, 1917, Temp. 2nd Lieut. W. E. Lunnon, attd. Oxf. ahd Buck. L.I., and to be transfd. to R.F.C. Gen. List; Dec. 26th, 1917. Temp. 2nd Lieuts. (on prob.) Gen. List, and to be confirmed in their rank:—H. R. Cleveland, G. Ponsford; Oct. 13th, 1917. A. Talbot; Oct. 15th, 1917. J. E. Ferrand, Oct. 16th, 1917. C. B. Whitney; Oct. 19th, 1917. L. Campbell; Nov. 4th, 1917. J. C. Wood; Nov. 13th, 1917. F. W. Nelson; Dec. 13th, 1917. G. R. Savage; Dec. 21st, 1917. J. L. Des Lauriers, A. C. Campbell; Dec. 22nd, 1917. J. G. Kennedy, N. H. Muirqen, M. L. Trapagna-Leroy, S. Gillatt, J. K. Clifford-Jones, E. Smith, V. Harley, L. C. Hickey; Dec. 23rd, 1917.

Balloon Commander.—(Graded as a Balloon Officer.)—Temp. Lieut. F. L Simmons, Gen. List, from a Balloon Officer; Dec. 4th, 1917.

General List.—Temp. 2nd Lieut. G. MacL. Campbell resigns his commission; Jan. 20th. Temp. 2nd Lieuts. relinquish their commissions on account of ill-health contracted on active service, and are granted the hon. rank of 2nd Lieut.:—

L. I. Eskell, G. C. Leven; Jan. 20th. R. H. Abell, late Prob. Flight Officer, R.N.A.S., to be Temp. 2nd Lieut. (on prob.); Dec. 4th, 1917. To be Temp. Capts. (with pay and allowances as Lieut.) whilst acting as Adjts.:—Temp. Lieut. H. M. Parsons, Gen. List; Nov. 30th, 1917. Lieut. R. A. Young, Glouc. R., T.F.; Dec. 20th, 1917. Temp. 2nd Lieut. R. C. Ashfield, R. Highrs.; Dec. 24th, 1917. Temp. Lieut. R. G. T. Tudor-Jones, R. W. Fus.; Dec. 27th, 1917. Temp. 2nd Lieut. F. E. Wilshere, Gen. List, Temp. Lieut. M. G. Kiddy, Garr. Bn., Suff. R.; Dec. 29th, 1917. Temp. 2nd Lieut. D. W. Small, Gen. List; Jan. 20th. The notification in the *Gazette* of Jan. 8th, 1917, regarding 2nd Lieut. J. F. Woodthorpe, Norf, R., is cancelled.

Supplementary to Regular Corps.—The name of 2nd Lieut. (now Capt.) Leslie Francis Palmer Bawn is as now described, and not as in the *Gazette* of Mar. 13th, 1916, and subsequent *Gazettes*; 2nd Lieut. J. M. Thomson is placed on the retired list on account of ill-health contracted on active service; Jan. 20th.

Aeronautical Inspection Department.

London Gazette Supplement, January 17th.

To be Temp. Hon. Lieut. A. R. Pettitt, whilst employed as Assist. Inspector A.I.D.; June 1st, 1917.

QUESTIONS IN PARLIAMENT.

Commissions in the Air Services.

MR. BILLING in the House of Commons on January 16th asked (1) the Secretary to the Admiralty what procedure it is necessary to adopt for the purpose of enrolling as a mechanic in the R.N.A.S.; and what procedure it is necessary to adopt to obtain a commission in the R.N.A.S.; (2) the Under-Secretary of State for War what procedure it is necessary to adopt for the purpose of enrolling as a mechanic in the R.F.C.; and what procedure it is necessary to adopt to obtain a commission in the R.F.C.; and (3) the Parliamentary Secretary to the Air Ministry what procedure it is necessary to adopt for the purpose of enrolling as a mechanic in the new Air Service; and what procedure it is necessary to adopt to obtain a commission in the new Air Service?

Major Baird: Until the Air Force has been formed, the existing procedure continues as regards entry into the two Air Services for both officers and men. Due notice will be given of any change.

Control of the Air Services.

MR. JOYNSON-HICKS asked the Parliamentary Secretary to the Air Ministry whether, pending the constitution of the Air Force, the Board of Admiralty and the Army Council have transferred the control of the Royal Naval Air Service and the Royal Flying Corps to the Minister of Air?

Major Baird: No, Sir. Pending the completion of the arrangements for the unification of the two Air Services, their control will remain with the Board of Admiralty and the Army Council.

Constitution of the Air Force.

MR. JOYNSON-HICKS asked when the Orders in Council will be issued constituting the Air Force; and what is the cause of the delay?

Major Baird: The Air Board will be constituted as soon as the necessary administration, financial, and disciplinary arrangements have been completed. There has been and will be no avoidable delay.

Offices for the Air Ministry.

CAPTAIN CARR-GOMM asked the First Commissioner of Works if there are 900 rooms in the Hotel Cecil building; whether the inspectors acting for his Department have made any Report on the use of this building by the Air Board; and, if so, will he state the nature of this Report?

The First Commissioner of Works (Sir Alfred Mond): The number of rooms in the Hotel Cecil is 665. The inspectors of the War Cabinet Committee on Accommodation have made a report to the effect that the accommodation occupied by the Air Board is being satisfactorily utilised.

Mr. P. A. Harris: Is it not a fact that this hotel was commandeered before it was inspected by the Department concerned?

Sir A. Mond: No, it is not a fact.

Replying to Captain Carr-Gomm, who asked whether any additional building accommodation is now being demanded by Government Departments,

Sir A. Mond detailed the demands, including three from the Air Ministry.

The Air Ministry and the British Museum.

MR. WHITEHOUSE asked the First Commissioner of Works whether he assented to the proposal to use the British Museum for the purpose of the Air Ministry; and, if so, under what authority he acted?

Sir A. Mond: The proposal to use the British Museum for accommodating the Air Ministry was submitted by the President of the Air Board to the War Cabinet Committee on Accommodation. A large amount of space was required, and this space was not available in any other single building except the British Museum. As Chairman of the Committee on Accommodation I submitted the proposal in principle to the War Cabinet for decision. The War Cabinet assented to the proposal. Later, as Lord Rothermere was able to considerably reduce his demands for space, the matter was again before the War Cabinet, and I was able to advise that there was no longer the same necessity for accommodating the Air Ministry in the British Museum.

Mr. Whitehouse: In view of the fact that the control of the British Museum is vested by Act of Parliament in certain trustees, why was the decision of the trustees overruled by the right hon. gentleman's Department and the Government?

Sir A. Mond: The building of the British Museum is a Government building. It is under my Department, and is not vested in the trustees; and, obviously, the War Cabinet has the power of overruling the trustees of any museum.

Aerodromes and the Employment of Agricultural Labourers.

MAJOR BRASSEY on January 21st asked the Prime Minister whether contractors employed in the erection of aerodromes in rural districts are taking men from agriculture to carry out their work; and whether, in view of the importance of increasing the food supply of the nation, he will take steps to prevent this?

The Parliamentary Secretary to the Air Board (Major Baird): I am aware that this is a matter in regard to which some complaints have been received, and I am considering whether it is possible to take any further measures to meet them.

Mr. G. Lambert: Will the Government take steps to prevent agricultural labourers being induced to leave their employment?

Major Baird: It is very difficult to secure that altogether. These cases do not occur under the direct employment of the Government, but in the cases of contractors, and, it may be, sub-contractors. It is not altogether easy to stop it.

Aircraft Production in Ireland.

MR. CLANCY asked the Chief Secretary for Ireland whether his attention has been drawn to a resolution of the board of guardians of the Celbridge Union requesting the attention of the Government to the fact that at present some unused mills in that district might be immediately utilised in connection with the proposed aerodromes in the vicinity; and whether favourable consideration will be given to this suggestion?

Major Baird: I have been asked to answer this question. My attention has been drawn to the resolution referred to, and it is being considered in connection with the general question of the utilisation of facilities in Ireland for aircraft production.

AIRCRAFT WORK AT THE FRONT.

OFFICIAL INFORMATION.

British.

General Headquarters, January 15th.

"Snow prevented much flying on the 14th inst., though a little photographic and artillery work was carried out. Only a few combats took place, in which one hostile machine was brought down. None of our machines are missing. Following on the very successful daylight raid into Germany on the 14th inst., another was carried out during the night of the 14th-15th inst. The objective in this case was the steelworks of Thionville, midway between Luxemburg and Metz, where a ton of bombs was dropped. A further half-ton of bombs was dropped on two large railway junctions in the neighbourhood of Metz. Anti-aircraft gunfire and searchlight barrages were considerable round the objective. All machines returned."

War Office, January 15th.

"*Italian Front.*—During the past week our aeroplanes have destroyed six enemy machines and driven down others out of control. Our artillery have carried out several successful shoots, and our infantry patrol activity continues."

"*Palestine Front.*—Despite adverse weather conditions, our Air Service has within the past few days executed effective bombing raids on the enemy aerodrome at Jenin (30 miles south-east of Haifa) and on Amman (station on the Hedjaz Railway 47 miles north-east of Jerusalem). In each case many direct hits on the objectives were observed. Two of our machines are missing."

General Headquarters, January 17th.

"On the 16th inst. continuous rain prevented all flying. During the night of the 16th-17th inst., in spite of very bad weather, bombs were dropped on the large railway sidings at Bernsdorf (30 miles south-east of Metz) and on the railway south of Metz. All our machines returned."

War Office, January 19th.

"*Palestine.*—In aerial fighting on January 17th one enemy aeroplane was shot down and two others driven down out of control. On January 18th our aeroplanes dropped 80 bombs on a railway station west of Samaria and on camps in the neighbourhood; one enemy aeroplane was shot down."

"*Italian Front.*—The weather lately has been bad. Flying has only been possible on two days during the past week. On these days, however, we destroyed six enemy machines without any loss to ourselves."

General Headquarters, January 19th.

"On the 18th inst., although the sky was overcast all day, with rain at intervals, a certain amount of flying took place, chiefly consisting of observation for the artillery. Bombs were dropped and many rounds fired from low heights at numerous targets, including a long column, in which many casualties were seen to be caused. Three hostile machines were brought down by aeroplanes and one by our infantry, while another was driven down out of control by anti-aircraft gunfire. One of our machines is missing."

General Headquarters, January 20th.

"On the 19th inst., good visibility enabled a great many hostile batteries to be engaged successfully by our artillery with observation from the air. Over 300 bombs were dropped during the day on miscellaneous targets, including a large ammunition dump near Courtrai; and several thousands of rounds fired at the enemy in their trenches by our low-flying aeroplanes. Five hostile machines were brought down, and three driven down out of control. Four of our machines are missing."

War Office, January 20th.

"*Salonica.*—Our aeroplanes have bombed Tchestovo Station (north-west of Lake Doiran) and other objectives."

French.

Paris, January 15th.

"Allied airmen carried out numerous bombing raids on the railways in the Vardar valley and on enemy camps in the region of Dobropolie."

Paris, January 18th.

"On January 16th a German aeroplane was brought down by the fire of our anti-aircraft guns."

Paris, January 20th.

"On January 19th our air forces fought a number of aerial engagement. Six German aeroplanes were destroyed and two others fell within their own lines seriously damaged."

Italian.

Rome, January 15th.

"Four enemy aeroplanes were brought down by our airmen to the north of Foza, at Valstagna, and on Mt. Grappa, and our artillery accounted for a fifth machine near Ormelle. Two other machines were brought down by British airmen near Codogne (east of Conegliano). In the afternoon seaplanes effectively bombed enemy movements along the Lower Piave."

Rome, January 16th.

"There was considerable aerial activity along the whole front. English airmen brought down three enemy areoplanes in the region of Vazzola (south-east of Conegliano). Our airmen brought down a fourth at Arsie, and our anti-aircraft batteries a fifth at Cima d'Olmo (south-east of the bridge of the Priula)."

Belgian.

Havre, January 21st.

"A German bombarding aeroplane returning from Dunkirk was forced to descend on the evening of the 19th near Bulscamp. The four occupants, including one officer, were taken prisoners."

Personals.

Casualties.

Second Lieutenant EDWARD SIVEWRIGHT BACON, R.F.A. and R.F.C., who was previously reported missing on August 31st, 1917, and now officially presumed killed in action on that date, was the third son of W. C. F. Bacon, Shawbrook Lodge, Burnage Lane, Withington, Lancashire. He was aged 22.

Second Lieutenant ALAN SCOTT BALFOUR, R.F.A., attached R.F.C., who was killed in action on January 13th, was the younger son of Sir Robert Balfour, Bt., M.P. for the Partick Division of Lanarkshire, and of Lady Balfour, of Langham Hall, Langham, Essex, and 7, Prince's Gate, W. Born in 1884, he was educated at Harrow and Trinity College, Oxford, and got his commission in the Artillery in August, 1916, subsequently going into the R.F.C. Last year he married Edna Winifred, daughter of Mr. Frederick P. S. Harris, of 47, Buckland Crescent, Belsize Park, N.W.

Second Lieutenant FREDERICK EWAN BALDWIN FALKINER, M.C., Royal Irish Rifles and R.F.C., who was reported missing on August 21st, 1917, and has now been officially reported killed, was the eldest son of the late Henry Baldwin Falkiner, solicitor, and Mrs. Falkiner, of Greenoge, Terenure, Dublin. He was born in 1895, and was educated at St. Stephen's Green School, Dublin, and St. Columba's College, Rathfarnham, where he played in the Rugby fifteen. He entered Trinity College, Dublin, in 1913. At the outbreak of the war he enlisted in the 7th Battalion ("Pals") Royal Dublin Fusiliers, and was corporal of their machine gun section at the Suvla Bay landing at Gallipoli. He continued to serve as N.C.O. in the Serbian campaign of the winter of 1915, for which he received the bronze medal for military valour conferred by the King of Italy. After some months spent at Salonica as sergeant instructor in a machine gun school, he was recommended for a commission, and was in January, 1917, gazetted to the Royal Irish Rifles. He was at the taking of Messines Ridge, and was awarded the Military Cross for his gallantry in capturing a machine gun position. Subsequently he joined the R.F.C. His next younger brother, George Stride Falkiner, Royal Dublin Fusiliers, was killed in action five days earlier.

Observer Sub-Lieutenant ARCHIBALD GORDON, R.N., who was drowned while on active service patrol on January 7th, was the younger and last surviving son of Mr. and Mrs. W. E. Gordon, of 71, Oakley Street, Chelsea, S.W. He was born in May, 1897, and was educated at Temple Grove and Westminster, where he was elected a resident King's Scholar in 1911, and when he left in 1916, he was a monitor, secretary to "The Elizabethan," and a member of the school O.T.C. In December, 1916, he was granted a commission as sub-lieutenant in the R.N.V.R. for the R.N.A.S., and after some months' training he went abroad on active service last June, having been gazetted observer sub-lieutenant R.N., with seniority dated March 16th, 1917. His elder brother was killed in action in Flanders last August.

Lieutenant ROBERT LYNEDOCH GRAHAM, R.F.A. and R.F.C., was the second son of the Hon. T. Lynedoch Graham, Judge President of the Eastern Districts Courts, Grahamstown, South Africa. He was educated at St. Andrew's College, Grahamstown, and at Clare College, Cambridge, where he was an undergraduate when war was declared. Volunteering in January, 1915, he received a commission in the R.F.A., and went to France in the following May. In 1916 he transferred to the R.F.C., and was severely wounded in April. He was reported missing on September 16th, and a message dropped by German airmen on Christmas Day stated that he had been killed on that date. He was 22 years of age.

Flight Observer WILLIAM BASIL LOXDALE JONES, R.N., who was drowned while on active service patrol on January 7th, was the only son of the late Bishop of St. David's, of Gwynfryn, Taliesin, Cardiganshire. He was born in 1890 and educated at Harrow and Oxford. He obtained a commission in the Royal Marines on September 24th, 1914, and immediately went to France. He served with the R.N.A.S. in France and the Eastern Mediterranean, and was mentioned in despatches. He was recently gazetted Flight Observer, R.N., his promotion dating from December 31st, 1916.

Captain E. H. G. SHARPLES, R.F.C., who was killed while flying on January 19th, aged 19 years, was the only surviving son of Rev. H M and Mrs. Sharples, of Finghall Rectory, Yorkshire.

The Rev. W. Taesdale-Mackintosh, Chaplain to the Troops, Preston Barracks, Brighton, and Mrs. Mackintosh, 5, Alfred Road, Brighton, have received news that their youngest son, Second Lieutenant DOUGLAS F. MACKINTOSH, R.F.A., attached R.F.C., who was reported missing on October 2nd, 1917, is now officially reported killed in action on that date. He was educated at The Wick, Furze Hill, and Brighton College. On the outbreak of war he enlisted in the 7th Battalion 2nd Infantry Brigade, Australian Imperial Forces, and took part in the landing at Gallipoli, where he was shot through the throat and temporarily blinded. Returning to England for medical treatment, Second Lieutenant Mackintosh received a commission in the R.F.A. Special Reserve. Going to the Western front early in 1916, he remained there till December, when he came home on sick leave, and went out again in March, 1917. He joined the R.F.C. in the field on June 22nd, and served as an observer till his death some three months later.

Second Lieutenant LAWRENCE CASTELL STANLEY TATHAM, R.F.C., B.A., Trinity College, Cambridge, who was killed in action on January 11th in his 23rd year, was the second surviving son of the late Stanley Tatham, of Branksome Park, Bournemouth, and of Frances Emma Constance Tatham, at 2, St. George's Court, Gloucester.

Second Lieutenant A. MCDOWALL, East Lancashire Regiment, attached R.F.C., who was accidentally killed in England on January 12th, was the only son of Mr. and Mrs. G. A. McDowall, of Loughton, Essex.

Lieutenant GEORGE HEASMAN, who was killed on January 21st while flying on Salisbury Plain, was born at East Grinstead in 1890, and was the son of Mr. H. Heasman, the well-known owner of race horses. He was taught to ride by his father, and afterwards spent a season with the Foxhill trainer, W. T. Robinson. His first success was in 1911, when he won a hurdle race at Kempton Park January Meeting on his father's horse Jeanne la Folle. Afterwards he rode with success in Austria, as well as in this country. Lieutenant Heasman was originally in the Hussars, but in the summer of 1915 was appointed to King Edward's Horse, and went to France. He received his commission in the Flying Corps last spring.

Lieutenant FRANCIS HOPE PATTEN, R.F.C., who died at Norwich War Hospital on January 14th, the result of an aeroplane accident, was the second son of Mr. and Mrs. Hugh Patten, 37, Manor Place, Edinburgh. His age was 19 years and four months.

Second Lieutenant ARTHUR CHARLES PERRYMAN, Middlesex Regiment, attached R.F.C., only son of Mr. and Mrs. C. H. Perryman, of 5, Alwyne Square, Canonbury, was accidentally killed in an aeroplane accident on January 7th, aged 29. He was educated at the Mercer's School, and joined the A.S.C., M.T., in August, 1914. He obtained his commission in the Middlesex Regiment, in 1916, and volunteered for the R.F.C. the same year. He was in the retreat from Mons and the second battle for Thiepval. All his service was at the front.

Brigadier-General GORDON S. SHEPHARD, who has been killed in an aeroplane accident in France, was the second son of Sir Horatio and Lady Shephard, was educated at Summerfields and Eton and, after passing through Sandhurst, obtained a commission in the Royal Fusiliers in 1905. Before the war he did a great deal of yachting. He became a member of the Royal Cruising Club, and made some rather remarkable cruises in a small sailing yacht, on two occasions gaining the challenge cup of the club. In July, 1912, he joined the Royal Flying Corps, and flew over to France with the first five squadrons on August 13th, 1914. He received the Legion of Honour from General Joffre for good reconnaissance work during the retreat from Mons, and in January, 1915, he won the Military Cross. Subsequently he was promoted brevet-major and brevet lieutenant-colonel, received the D.S.O., and was five times mentioned in despatches. For the last year he has been in command of a brigade of the R.F.C.

Married.

On the 7th January, at St. Mary's, Clapham, Lieutenant G. G. COURY, V.C., South Lancashire Regiment and R.F.C., son of the late Raphael Coury and Mrs. Coury, of Liverpool, was married to KATHERINE MARY, only daughter of the late STUART LOVELL and Mrs. Lovell, of Clapham Common, London, S.W.

The marriage took place on January 16th at the parish church, Wye, Kent, of Captain HUMPHREY CLIFFORD LLOYD, M.C., 60th Rifles (attached R.F.C.), only son of Colonel Wilford Lloyd, M.V.O., Royal Body Guard, and Mrs. Lloyd, of 8, Sussex Square, Brighton, and Miss CONSTANCE LOUDON, only daughter of Mr. and Mrs. James Hope Loudon, of Olantigh, Wye.

On January 14th, at All Saints', Clifton, Bristol, Major R. KINGSLEY PILLERS, Northants Regiment, attached R.F.C., son of the late E. J. Pillers, of Clifton, was married to BEATRICE MARY, youngest child of the late T. AUBREY, and Mrs. Aubrey, of Clifton.

On January 2nd, at St. Martin-in-the-Fields, London, W.C., Captain C. GORDON RILEY, R.F.C., second son of Mr. and Mrs. W. Riley, of Ravensbourne Park, Catford, S.E., was married to DORA, elder daughter of Mrs. H. G. WITNEY, of Ladywell.

On January 5th, at St. Matthew's, Bayswater, Captain CHARLES MOLYNEUX SMITH, M.C., R.F.C., eldest son of Mr. and Mrs. Arthur Smith, of Glenavon, Oaklands Road, Bedford, was married to BARBARA, widow of Captain W. B. FULLER, The Queen's Regiment, and daughter of Major and Mrs. S. A. Pixley, of Maybury Knowle, Woking. Captain and Mrs. Smith immediately after their wedding adopted the name of CARINGTON, by which name they will be known in future.

On January 19th, at St. Luke's Church, Chelsea, OLIVER BYERLEY WALTERS WILLS, M.C., lieutenant, R.F.C., son of Mr. and Mrs. George Tarlton Wills, of Moorings, Sunningdale, Berks, was married to URSULA, daughter of Mr. and Mrs. HERBERT WILDON CARR, of 107, Church Street, Chelsea.

To be Married.

The engagement is announced, and the marriage will take place in February, leave permitting, between Second Lieutenant WALTER A. MERRILL, R.F.C., son of the late A. H. Merrill, of Montreal, Canada, and ANNIE LEY, daughter of the late G. B. HUDSON, formerly of Frogmore Hall, Herts, and Mrs. Hudson, of 34, Gordon Road, Ealing, W.

The marriage between Captain CAMPBELL T. SANCTUARY, R.F.A., attached R.F.C., and Miss E. BARBARA PARSONS will take place at Misterton, Somerset, on February 6th.

The engagement is announced between KENNETH E. WARD, lieutenant, Welch Regiment, attached R.F.C., and KATHLEEN, eldest daughter of Mr. and Mrs. Walter ESSE, of Kensington.

The marriage between Mr. F. WHITWORTH WRIGHT, R.F.C., and Miss JOYCE M. MORLEY FLETCHER will take place at Holy Trinity Church, Marylebone, at 2 on February 5th.

Items.

It is with regret that we learn from Paris of the death at the early age of 49 years of M. LOUSI SEGUIN, the President of the Société des Moteurs Gnome et Rhone. The deceased was one of the leading aircraft engine authorities in France, and his early death will be a serious loss to the movement.

The will of Captain HENRY ERIC DIXON, Middlesex Regiment, attached R.F.C., accidentally killed while flying, has been proved at £658.

The will of Second Lieutenant DAVID DENNYS FOWLER, R.F.C., of Rottingdean, killed in March, aged 19, has been proved at £3,645.

MODELS.

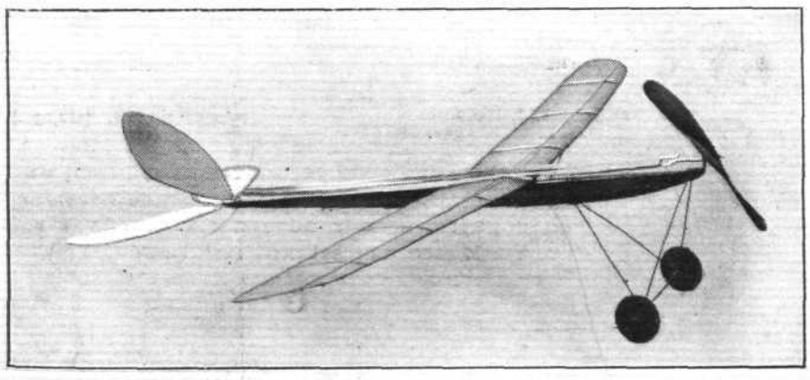
Scale Drawings of Models.

AN oft-repeated query from those who wish to start building model aeroplanes is "Where can I get scale drawings and instructions for building a model?" It is a question which can now be answered satisfactorily, for Messrs. A. E. Jones, Ltd., have got out a set of blue-prints by the aid of which and the accompanying instructions it should be possible for any one who is at all handy with tools to build a very practical and serviceable flyer. From the accompanying photograph it will be seen that the monoplane known as the A. E. Jones, R.O.G. No. 1, is of the tractor type; it has a wing span of 32 ins., and when complete the weight of the machine should not exceed 4 ozs., in fact, it will probably be found to come out about 3½ ozs.

There are two blue prints, one showing the general arrangement and the other the details, and in order to facilitate reference the various parts are numbered, corresponding with numbers on the general arrangement drawing.

The *fuselage* of the machine is a hollow spar and the framework of the wings, tail and rudder is of wire. The instructions clearly indicate the procedure to be followed in making these parts, and great care has been taken to obviate mistakes being made. When it is stated that the machine has been designed by Mr. C. Burchell, it will be realised that it is of a very practical type and is the result of a lengthy experience. The drawings have been excellently drawn by Mr. C. P. Walker, and are carefully reproduced. The price of the set of drawings and instructions is 5s.

Messrs. A. E. Jones propose later to prepare sets of parts for the building of the model, but these are not ready yet. In the meantime, however, the firm is able to supply all the material necessary. It is hoped too that this venture, if it proves popular, will lead to further sets of designs and instructions being prepared so as to cover a complete range of models.



The A. E. Jones r.o.g. No. 1 monoplane.

A Duration Competition.

THE Finsbury Park and District Aero Club have arranged a competition, to be held on February 2nd, for prizes offered by Mr. A. E. Jones. The conditions are as follows:—

The competition to be held on Parliament Hill, weather permitting.

To be for duration only.

Entrance fee 6d., to be paid on ground before competition.

Tractor machines only, monoplane or biplane.

Loading not less than 3 ozs. to the square foot, counting main planes only.

One trial off ground, and two hand-launched, time permitting.

All competitors to be ready to start at 3 p.m.

The competition not to be held unless there are more than three entries.

SIDE-WINDS.

GREAT success attended the Fancy Dress Social held at the Central Aircraft Company's premises, High Road, Kilburn, on January 12th. Tastefully decorated, the new Fabric Shop, which had been kindly lent for the occasion, made an excellent concert hall and ballroom. A very fine programme was arranged, including a duet at the piano by Miss Borthwick and Mr. Mason and songs by Miss F. Wooley. The Walthamstow Silver Band was in attendance, and rendered excellent music for the dancing. Some very novel and amusing dresses were introduced by the employees, which gave the judges, C. H. Cattle, Esq. (Central Aircraft), J. Burgoyne, Esq. (A.M.C.), and N. Whitmee, Esq. (Handley Page) an exceedingly difficult task to decide who should receive the prizes presented by the firm. They eventually decided, Miss Harrison 1st and Miss Hatswell 2nd for the ladies, and Mr. R. McCrae 1st and Mr. S. Harper 2nd for the gentlemen.

A very good attendance was made by employees and their friends and an exceedingly pleasant evening came to a close all too soon. Thanks are due to A. J. Cattle, Esq., for his generous support, and to the Social Club Committee for their untiring efforts.

THE second annual dinner of the employees of the Grahame-White Aviation Co., Ltd., which was held on January 19th in the Pillar Hall of the Victoria Station Restaurant, was an event to which the men will look back with pleasure. That it was a great success goes without saying, they had the privilege of entertaining a number of members of the Air Board. The speeches were commendably short and to the point. Mr. Claude Grahame-White, who once more proved an ideal chairman—despite the affliction of an attack of laryngitis—in proposing "His Majesty's Air Force," put in a strong plea for more co-operation between the Government and contractors with a view to preventing overlapping and duplication of effort. Major-General Sir H. M. Trenchard, Chief of the Air Staff, who was given a rousing reception, in replying, appealed to the men to do their utmost to supply the machines without which it would be impossible for him to do the job which he had come home from the front to do. Rear-Admiral Mark Kerr, Deputy Chief of the Air Staff, who, but for a sudden bereavement, would have been present, was to have responded also, but in his place Sir Henry Fowler said a few words, in the course of which he mentioned that the subject raised by Mr. Grahame-White was not being lost sight of. Lieut. Louis Noel, who is now enjoying a holiday in England, and whose rising was the signal for an outburst of applause, which was renewed on it being announced that the British Military Cross has just been added to the long list of honours conferred on him by the Allies, paid a graceful tribute to the fine work of the British Air Services and urged his old comrades at Hendon to do everything in their power to help those at the front by providing machines. Other speakers were Mr. H. W. Matthews, Major Dayson, Mr. C. Musker, Lieut.-Col. W. Alexander, D.S.O., Mr. F. W. Dudham, Mr. J. C. Martin, and Brigadier-General Guy Livingstone

During the evening the Grahame-White Orchestra proved that there is plenty of musical talent in the works and their excellent rendering of a number of items demonstrated the skilful leadership of the bandmaster, Mr. F. W. Dudman. There was also an enjoyable concert, to the programme of which Miss Ethel Levey (Mrs. C. Grahame-White), Miss Georgette Cohan, Miss Nellie Ganthony, Miss Ethel Durden, Miss Florence Jenkens, and Messrs G. H. Elliott, Jerome Murphy, Vernon Watson, Frank Webster and Joseph Farrington contributed, while Mr. Adolph Mann was the accompanist. A popular item was the presentation of medals to the Grahame-White football team which, in the season 1916-17, won the N.W. London League and Alliance Championship, winning 13 matches out of the 14 played. Another medal was also presented to Mr. G. Cooper as winner of the semi-final in a 7-stone-10 open boxing competition held under the auspices of the Grahame-White Boxing and Athletic Club and the Finsbury Radical Club.

WHILE on the subject of the Grahame-White Co., mention must be made of the beautiful souvenir which has been produced of the King and Queen's visit to the works on December 4th last. It has been produced with the object of giving every one in the service of the Company a suitable and permanent record of this historical event. Apart from the description of the Royal visit and an account of the development of the Company, the book contains a great many interesting snapshots secured at Hendon in the days before the war.

THE name of the B.D.V. Aircraft Spares has been altered to P.D.V. Aircraft Company, Ltd., and not P.O.V. as mentioned in our last number. The management will be carried on as heretofore by Mr. H. Philippe De Vos, who will be assisted by Mr. Robert Lee and Mr. S. Marshall. The firm are now in a position to turn out all metal aircraft components.

COMPANY MATTERS.

Simms Motor Units, Ltd.

AT the general meeting of shareholders of this Company, held last week, it was decided to declare a dividend of 25 per cent. on the paid up capital of the Company; to transfer the amount of £4,000 to reserve account, and to carry forward a balance of £33,757 15s. 6d. to the next account.

IMPORTS AND EXPORTS, 1916-1917.

AEROPLANES, airships, balloons, and parts thereof (not shown separately before 1910). For 1910 and 1911 figures, see "FLIGHT" for January 25th, 1912; for 1912 and 1913, see "FLIGHT" for January 17th, 1914; for 1914, see "FLIGHT" for January 15th, 1915; for 1915, see "FLIGHT" for January 13th, 1916; and for 1916, see "FLIGHT" for January 11th, 1917.

	Imports.		Exports.		Re-Exportation.	
	1916.	1917.	1916.	1917.	1916.	1917.
	£	£	£	£	£	£
January ...	1,509	10,842	6,399	67,033	Nil.	Nil.
February ...	6,444	9,479	30,693	26,512	—	6
March ...	3,388	11,158	17,872	58,517	7	—
April ...	3,383	21,141	22,608	21,151	3,783	—
May ...	1,986	6,877	26,165	59,713	300	—
June ...	4,986	2,670	50,287	14,647	—	—
July ...	2,072	9,104	12,932	106,250	—	—
August ...	2,583	18,680	13,555	68,315	420	258
September	1,076	9,047	36,048	56,491	—	30
October ...	952	58,086	9,289	73,580	8	100
November	7,406	169,574	12,858	75,632	—	—
December	6,335	82,646	43,481	19,160	—	—
	42,120	409,304	282,187	647,001	4,518	394

PUBLICATIONS RECEIVED.

The New Hazell Annual and Almanack, 1918. By T. A. Ingram, M.A., LL.D., London: Henry Frowde, Hodder and Stoughton. Price 5s. net.

"Wellcome" Photographic Exposure Record and Diary for 1918. London: Burroughs Wellcome and Co., Snow Hill Buildings, E.C. 1. Price 1s. net.

The Grahame-White Company Souvenir of the Visit to the London Aerodrome of Their Majesties the King and Queen. The Grahame-White Aviation Co., Ltd., London Aerodrome, N.W.

Aeronautical Patents Published.

Applied for in 1916.

The numbers in brackets are those under which the specifications are printed and abridged, &c.

Published January 17th, 1918.

13,866. A. J. REYNOLDS. Arrangement of guns on aircraft. (112,030.)
18,252. L. T. DELANEY. Radiator for aeroplanes, &c. (112,043.)

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